THE IRON AGE

Special Articles

The first part of a two-part article describing the basic precautions for the successful fabrication of stainless steel parts by welding appears in "Welding Stainless Steels," on p. 57. The importance of uniform sinusoidal welding currents, consistent time intervals, constant welding pressures, oxide-free surfaces, and types of electrodes are stressed as the guide posts for welding that will avoid carbide precipitation.

"Paints for Enclosed Structural Members in Steel Housing Construction," starting on p. 63, describes an investigation into the protectiveness of thirty-four kinds of paint systems for the purpose of determining corrosive-proof coatings for all types of exposure.

Issue Highlights

Economic repercussions of the steel and coal strikes grew grimmer this week, increasing pressure for a settlement before a major part of the economy grinds to a halt. The strike begun this week against Aluminum Co. of America leaves less than 50 pct of the industry's productive capacity in operation. There was little hope for a quick settlement either in steel or coal as the USWA strike entered its third week while the UMW tieup started its fifth week. . . . . . **p. 81**

There is no truth in the rumors—always rife at this time of the year—that Phil Murray intends to step down as head of the United Steelworkers of America. Much of this talk is either bilge or wishful thinking, with Reuther rumored as the new boss. But Reuther is having troubles of his own. . . . . . **p. 83**

The National Metal Congress and Exposition opened in Cleveland on Monday. It will run all week. About 350 nationally known firms are exhibiting their products in keeping with the theme of the show, "Economy in Production." Early in the week a record crowd jammed Cleveland's huge Public Auditorium, assuring the success of the show. . . . . . **p. 84**

McCormick works of International Harvester Co. laid off about 35,000 workers as the result of a parts shortage. Harvester officials said that the McCormick plant has plenty of steel to make its own parts but that their parts suppliers had run out of steel for some items. . . . . . **p. 89**

Coming Next Week

An on-the-spot report by IRON AGE editors of the highlights of the National Metal Show will appear next week. With camera and typewriter, the staff will bring the show —its technical meetings—its social activities—the exhibits—to those unable to attend in person. Another article will describe the protective coating of tractor parts in a one-stage operation. This method cleans the parts and covers them with a phosphate coat that provides surface protection as well as a good paint base.

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OUR 71ST YEAR
OF INDUSTRIAL SERVICE

Steel Loss Set At 4.3 Million Tons

Zero Hour Here For Fabricators

Steel Scrap Market Remains Quiet

The Iron Age SUMMARY

IRON AND STEEL INDUSTRY TRENDS

BY the end of this week the steel strike will have cost the nation 4.3 million tons of steel. If the strike should last a month it will mean a severe shortage of steel for from 4 to 5 months. A longer tieup will almost certainly hit purchasing power so badly that a sharp business setback will result.

Not counting losses to coal miners and employees of fabricating companies, lost wages at the end of this, the third week of the steel strike, will add up to about $100 million in basic steel alone.

Fabricators Are Closing Down

The zero hour is now at hand for many steel users. Some have already shut down. Others will be idled this week. For the rest, closing may be closer than most people think. The blow falls quickly in a busy plant when a shortage shows up in a single part and stops the whole assembly line.

Fabricators who turned to aluminum when steel was struck need not be too concerned over supplies because of the strike called this week at some Aluminum Co. of America plants. Alcoa's ingot capacity has been cut in half but the other two producers, Permanente and Reynolds, which account for a little over 50 pct of American aluminum capacity, are still operating. With material also available from Canada, this means that it will be some time before the aluminum shoe pinches.

The steel gray market has not come back as many had expected. True, there are a few curbstone brokers showing themselves again. But with 90 pct of the industry down—the national steel ingot operating rate for this week is 9.5 pct of rated capacity—their chances of obtaining substantial tonnages are limited. Moreover, the few mills which are working are keeping a close check on their shipments.

Steel Mills Still Getting Orders

The mills are still receiving orders for steel. Order volume is at about the same level as it was before the strike. Most companies are accepting the orders and confirming them, but promising nothing in the way of shipment. A few are still undecided what to do, and the orders are just piling up on the sales managers' desks.

Steel buyers are still ordering, on the theory that when production is resumed the mills will schedule and produce all the old orders first and then enter and quote shipping dates on the orders received since the strike started. On this basis, most orders placed since Oct. 1 would not be shipped until mid or late January.

Scheduling will vary somewhat by product and by customer, however, and regular customers' quotas will be considered in scheduling and shipping the items in tightest supply after the strike. Unless the strike lasts long enough to cripple business, the distribution of steel on a quota basis will be here for some time. The warehouses and the few steel mills still operating are using quotas now; otherwise they might leave some of their best customers high and dry.

Sheets Are 2 Months Behind

On steel sheets the industry is now as much as 2 months behind at the prestrike demand level. Before the end of September a number of the big mills fell as much as a month behind on promises. Part of this loss came from off-grade coke; the 3-day coal mine work week was blamed. Unless the coal strike ends before the steel workers return, more of the same production problems are ahead.

The iron and steel scrap market is generally quiet. No outstanding price weakness has developed in steelmaking grades though a few more weeks of mill idleness may bring some price testing, and if the strike lasts long enough, demand for steel will not be strong enough to support anything like current scrap quotations. Due to a little weakness at Pittsburgh THE IRON AGE steel scrap composite was off 8¢ to $26.50 per gross ton.

Appliance production by most major companies is not yet affected by steel shortages primarily because 2 months ago these firms told their parts suppliers to cover steel needs for an additional 6 weeks in advance. On this basis most of the larger companies should be able to maintain current production rates until mid-November.

Substitute 1 Machine for 3 or 4!

RAISE PRODUCTION and LOWER COSTS

BY COMBINING OPERATIONS with the MOTCH & MERRYWEATHER "DE" (Double End) TRANSFER MACHINE

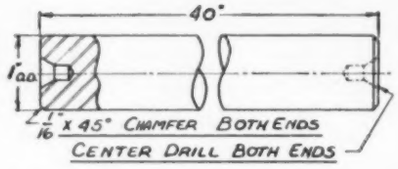
1 SAWS STOCK TO ACCURATE LENGTHS

2
(1) Chamfers both ends.
(2) Center drills both ends.
(3) Center drills and chamfers both ends. (4) Threads both ends (to a reasonable length).
(5) Trepans one or both ends.
(6) Turns one or both ends (box tool). (7) Chamfers O.D. and I.D. of tubing. (8) Reams one end or both ends of tubing.
(9) Chamfers O.D. and reams both ends of tubing.

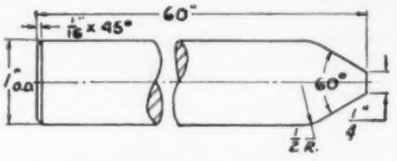
MORE THAN A NEW MACHINE—ACTUALLY A NEW METHOD

• The Motch & Merryweather "DE" (double end) Transfer Machine has no equivalent. Standard bar stock is automatically fed, cut off with a square *milled finish* to accurate lengths of ±.004"; then automatically transferred to equalizing, self-centering jaws for accurate double-end machining. You save at least one operator; save several handlings; save overhead and floor space; save tooling. Husky construction makes for trouble-free service and long, profitable life.

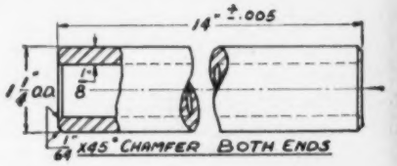
Illustrated below are six typical "transfer" jobs.



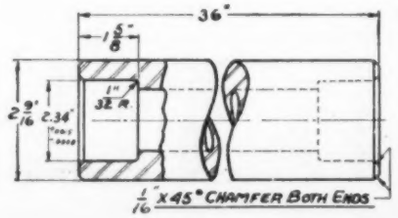
Operation: Cut off, chamfer and center drill both ends.
Material: SAE 1040 ground shafting.
Production: 240 pcs/hr.



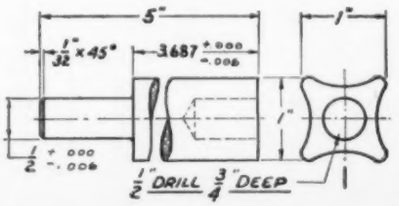
Operation: Cut off, chamfer one end, point opposite end.
Material: D SAE 1141 C. R.
Production: 163 pcs/hr.



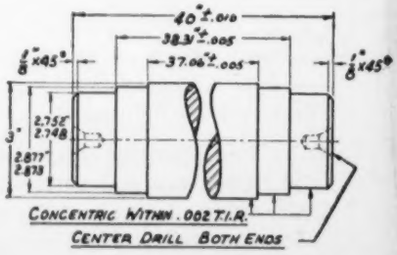
Operation: Cut off and chamfer both ends.
Material: 1020 seamless tubing.
Production: 342 pcs/hr.



Operation: Cut off, bore and chamfer inside and outside, both ends.
Material: SAE 1020 tubing.
Production: 180 pcs/hr.



Operation: Cut off, turn one end, drill opposite end.
Material: Extruded brass.
Production: 200 pcs/hr.



Operation: Cut off, box mill, turn and center drill both ends.
Material: SAE 1020.
Production: 140 pcs/hr.

THE MOTCH & MERRYWEATHER MACHINERY CO.
PENTON BUILDING • CLEVELAND 13, OHIO

AT YOUR COMMAND • AN UNPARALLELED EXPERIENCE IN CIRCULAR SAWING

NIAGARA

Announces New, Improved Circle Shears

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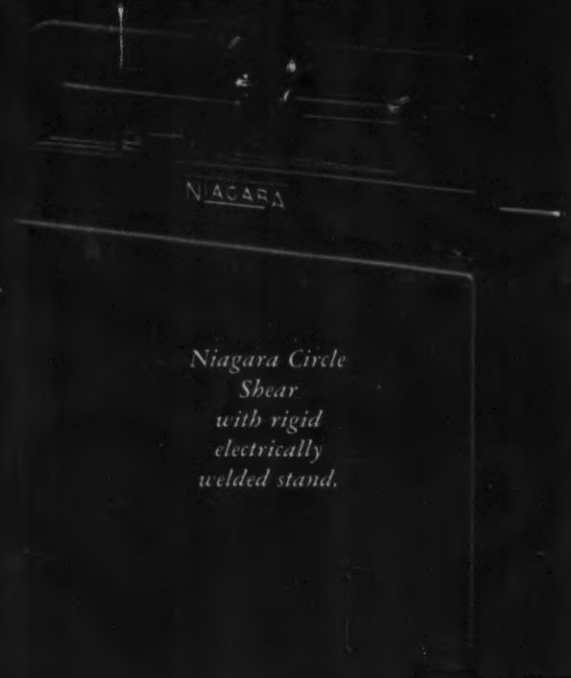
NEW SAFETY - Gears are completely enclosed within housing.

EASY OPERATION - Hobbed steel gears are smooth running. Quick acting center clamp holds the blank. Unmarked sheets can be quickly centered by adjustable swinging gauge. Graduations on bed show approximate diameter of circle.

NEW CUTTING HEAD - Box section design provides strength to maintain cutting and clearance angles for clean accurate work. Cutters and shafts are adjustable. Cutting head can also be used for slitting.



Niagara Circle Shear with rigid electrically welded stand.

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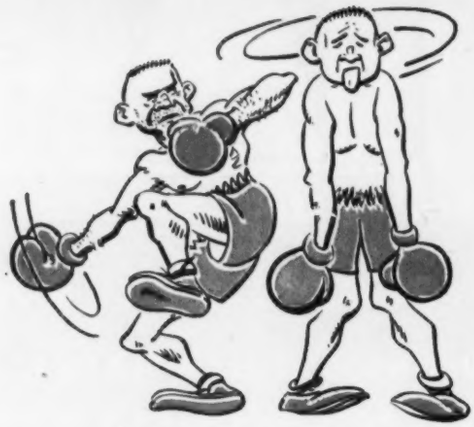

Fatigue Cracks

By Charles T. Post

Essential

In the article, "Stamping Expedites Steel Burial Casket Output" (Oct. 13, 1949), we learn that "logical application of a hydraulic press with appropriate dies" has pepped up production.

Appropriate dies, we might say, now are essential to the business from beginning to end.

Slowdown

The summary of the same article declares that "The number and speed of operations normally required have been reduced" by the new techniques.

We're all for cutting down the number of operations, but let's not dilly dally.

Classic

A touch of the classic crept into the heading for Jack Anthony's "Nonferrous Metals Outlook" page last week.

"Lead drops again," it read.

Whether the old law of gravity or the new law of levity was responsible, we wouldn't want to say.

Mold

"The super deLavaud process — casting pipe in a revolving, water-cooled metal mold where the pouring ladle and mold are stationary—has been installed in the plant."
—Photo caption, THE IRON AGE, *Oct. 13, p. 50.*

For sure, these revolving stationary molds will make inventor deLavaud spin in his grave.

Coke

The Coca-Cola Co., we note, has broken out in perspiration over the way the press has been reaching for a coke. The advertising journals, *Printer's Ink* and *Advertising Age*, are carrying full page advertisements to plead with writers of editorial and advertising copy to reach for Cokes, instead. As we understand it, the copyright laws protect a name of this sort only so long as use of the capital letter keeps it from becoming a generic term.

Years ago duPont went through the same thing with Cellophane. As a school-boy editor we were almost shaken out of our green celluloid (copyright's run out on that) eyeshade, by a stiff letter from a duPont attorney calling us to heel for writing cellophane. It took us a long time to find out that we weren't the only one to receive the same epistle, but we had months of pleasure envisioning the duPonts scanning our little sheet.

Now we are tickled over the thought that your favorite family journal may run the Coke people ragged. Every time they see the word coke in an f.f.j. headline, they are going to have to read the whole article to find out whether it's the kind that refreshes the gullet or the blast furnace, or even whether we might be slipping in a little tinplate on them. If we know the devilish tricks of the brains department, it will taunt the Coca-Cola attorneys with lots of coke from coke ovens then slip in some bottled coke just to see whether the lawyers can figure out what it's all about. We can envision the brains boys chipping up Koppers coke by the hour to put in those bottles, against the day the case is taken to court. Then

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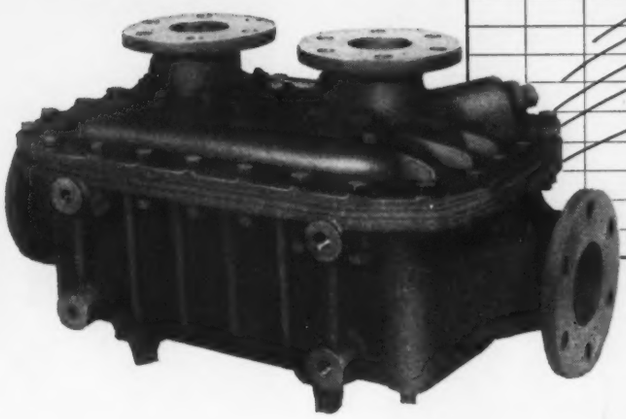
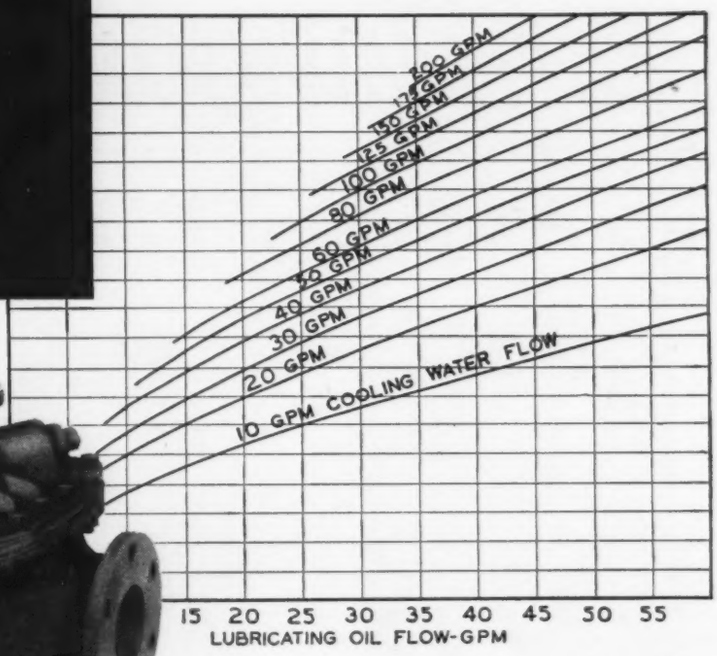
HARRISON OIL COOLERS





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BUILT TO DO A JOB AND DO IT WELL

HARRISON

HARRISON RADIATOR DIVISION, GENERAL MOTORS CORPORATION, LOCKPORT, N. Y.

Iron Age Introduces

RICHARD H. DIESEL, production manager, Stamford Div., Yale & Towne Mfg. Co.

CYRIL P. PESEK, vice-president in charge of engineering and in charge of company property, Minnesota Mining & Mfg. Co.

HENRY M. METCALF, chief industrial engineer, Republic Steel Corp., as announced in a recent issue.

Richard H. Diesel has been named production manager, and **Frank S. Haniewich** assistant production manager, Stamford Div., the YALE & TOWNE MFG. CO., Philadelphia. Mr. Diesel succeeds **Frank C. Prucha** who will retire in November. Mr. Haniewich joined the company this year as systems engineer, after 12 years with the Weatherhead Co., Cleveland.

Floyd Prunkard has been appointed general manager of the building products division of LEVINSON STEEL SALES CO., Pittsburgh. The division is the Pittsburgh representative of the Reynolds Metals Co. and the Virginia Metal Products Corp.

Francis J. Sehn has been named sales engineer in Detroit for the CLEARING MACHINE CORP., Chicago. He was previously chief die engineer for the Fisher Body Tank Div.

C. P. Pesek, vice-president in charge of engineering, MINNESOTA MINING & MFG. CO., has recently been placed in charge of all company property. Mr. Pesek has been with the organization for six years, and a vice-president since 1947. **Lloyd Hatch** has been assigned the job of coordinating research and new product development for the company. Mr. Hatch is vice-president, formerly in charge of the firm's roofing granule division. **Clarence B. Sampair,** vice-president in charge of production, has been assigned new duties connected with labor relations. Mr. Sampair has been with the company since 1927.

Paul C. Grimes has been named sales manager for the G. S. BLODGETT CO., Burlington, Vt. Mr. Grimes has been with the company since 1935 and is former midwest representative for the organization.

Harold Q. Noack has been appointed division vice-president, central sales division, COLUMBIA STEEL CO., San Francisco. Before recently joining the company, Mr. Noack was Pacific Coast manager for Phelps Dodge Copper Products Corp.

Howard R. Swartz has been appointed general sales manager for the CLEVELAND CAP & SCREW CO., Cleveland. He has been transferred from Lansing, Mich., where he represented the Cleveland company for a number of years as a member of M. C. Snyder Co., manufacturer's agents.

Alan L. Cornick, formerly associate counsel in charge of tax matters, will head the new office of tax affairs recently established by the FORD MOTOR CO., Dearborn. **Donald Kehl,** associate counsel, has been named assistant general counsel.

CHARLES E. WALKER, vice-president, Dravo Corp.

WALTER J. MAYTHAM, JR., Pacific Coast district manager, Westinghouse Electric Corp.

C. K. BANKS, director of research, Metal & Thermit Corp.

C. K. Banks has been named director of research, the METAL & THERMIT CORP., New York. Mr. Banks was formerly connected with the Chemotherapy Div. of Parke Davis & Co.

E. W. Allison has been elected secretary-treasurer of Detrex Corp., Detroit. Mr. Allison, who has been with the company since 1941, has progressively advanced through the legal dept., and the positions of assistant secretary and treasurer of the company.

Clarence L. Holmberg has been appointed superintendent of business procedures, Indiana Harbor Works, THE INLAND STEEL CO., Chicago. Since 1946 Mr. Holmberg has been manager of the order division of the company's sales department. **Henry N. Schumacher** has been named to succeed him as manager of the order division.

Charles E. Walker, Jr. has been elected vice-president, DRAVO CORP., Pittsburgh. He will continue as secretary and director of industrial relations, which position he has held since 1944.

James E. Lewis has been named president of CALIFORNIA COLD ROLLED STEEL CORP., Los Angeles. He succeeds **F. L. MacQuarrie**, founder of the company and its president until his retirement last month. Mr. Lewis has been serving as vice-president and general manager of the company since 1940.

Adolph W. Machlet has been promoted to chairman of the board of directors, The AMERICAN GAS FURNACE CO., Elizabeth, N. J. **Philip C. Osterman** succeeds Mr. Machlet as president and treasurer of the company, who has held these offices since 1926.

Joseph D. Kelly has been named sales promotion manager for passenger and truck tires, B. G. GOODRICH CO., Akron, Ohio. Mr. Kelly, who has been a member of the public relations staff since 1945, succeeds **R. S. Marker** who has resigned.

P. M. Offill, Jr., has been appointed representative for the sale of suspended arches and walls in the Pittsburgh area of the GEORGE P. REINTJES CO., Kansas City, Mo. Mr. Offill has until recently been representing the company in the California district.

Angus C. Scott, former assistant resident representative at East Pittsburgh, has succeeded **Ernest P. Schroeder** as resident representative, East Pittsburgh Works, WESTINGHOUSE ELECTRIC CORP., Pittsburgh. **Walter J. Maytham, Jr.**, has been named the corporation's Pacific Coast district manager and succeeds Charles A. Dostal, vice-president.

C. A. Mapp has been appointed district sales representative for the new Diesel Locomotive Sales and Service Office, FAIRBANKS, MORSE & CO., Chicago. **H. D. Buckner** has been appointed area service supervisor for diesel locomotives.

Walter Johnson has been appointed sales manager, GEORGE K. GARRET CO., Philadelphia. Mr. Johnson joined the company in 1941 and has since held various positions working in cooperation with sales, production and procurement divisions.

J. R. Connell has been appointed assistant purchasing agent, the BABCOCK & WILCOX TUBE CO., Beaver Falls, Pa. Since 1942 Mr. Connell has been in charge of the purchasing department of the company's welded tube division at Alliance, Ohio.

Dick M. Landis has been appointed assistant manager, industrial division, the DE LAVAL SEPARATOR CO., New York. He has been with the company since 1937. **Robert K. Hood** has replaced Mr. Landis as manager of the industrial department.

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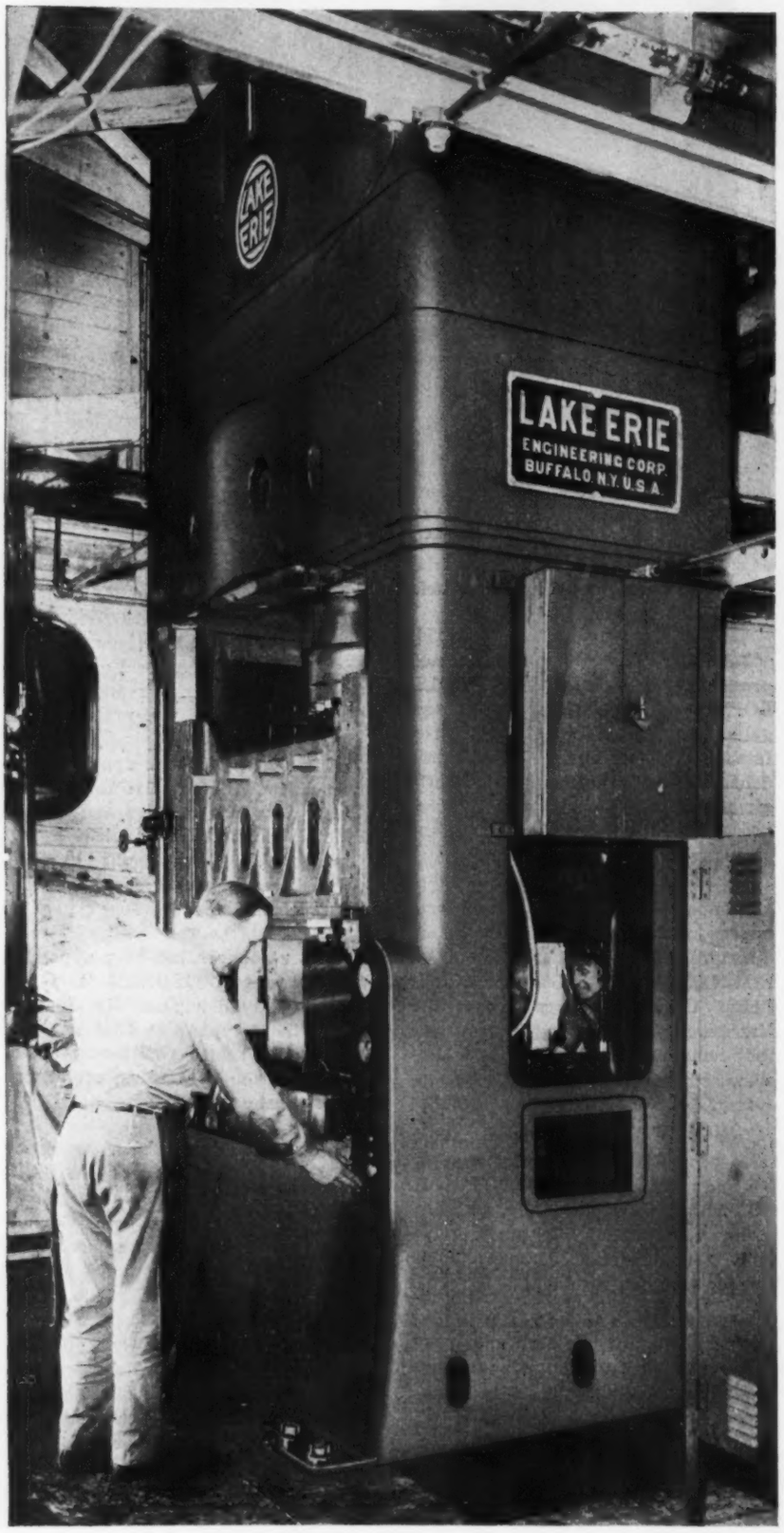
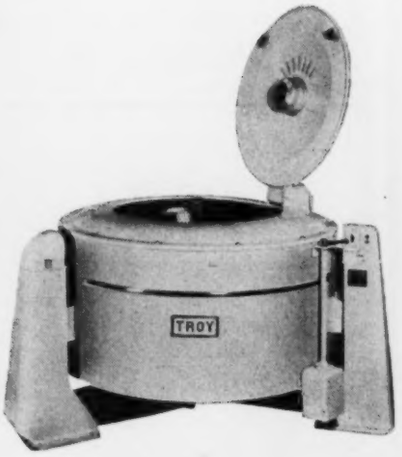
American Machine & Metals



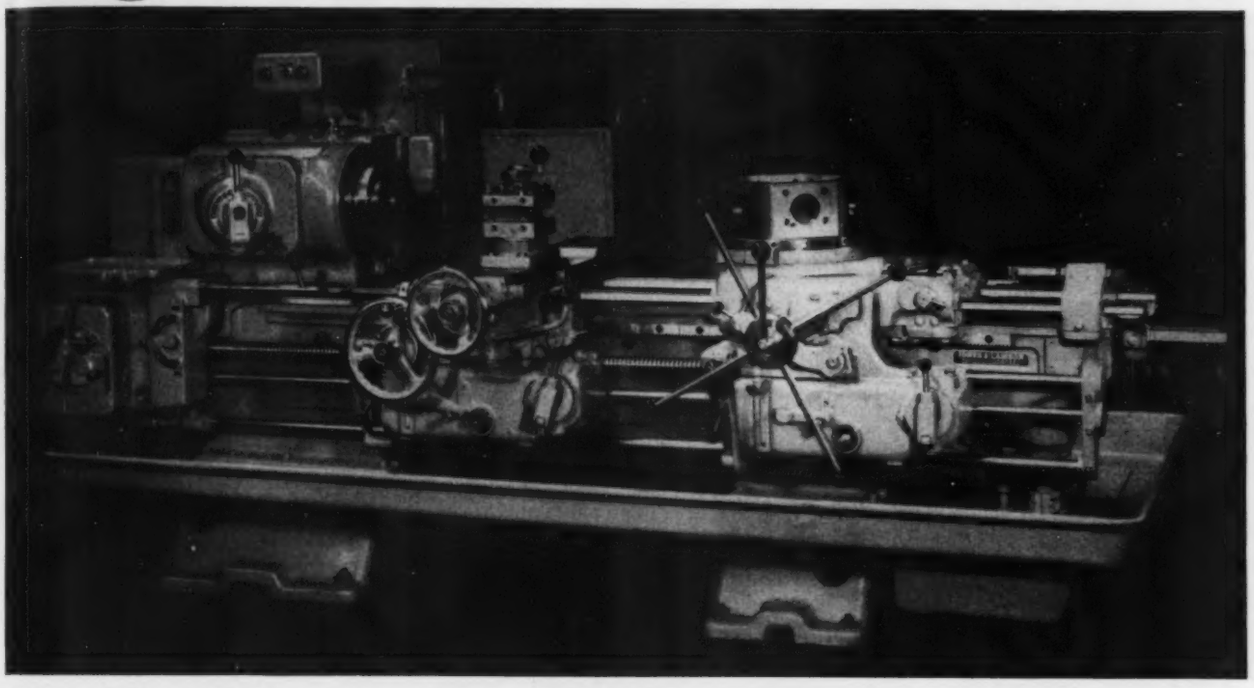


A big advantage of this 450-ton Lake Erie Hydraulic Press is its versatility and ability to perform a wide range of manufacturing functions. American Machine and Metals report that the press is already handling the following types of work and more are contemplated—

- **Plate forming of mild steels.**
- **Piercing washer trunnion spiders.**
- **Multiple riveting of spiders to heads.**
- **Deep drawing of shell doors, dump valves and door latch housings.**
- **Stamping stainless steel washer parts.**
- **Blanking fan blades and discs.**
- **Forming stainless steel cylinder heads.**

Many manufacturers are taking advantage of the greater flexibility and efficiency of modern hydraulic presses. They are replacing outmoded, inefficient, costly methods of production with the latest Lake Erie Hydraulic Presses.

Over 4½ Tons of High Powered Precision!



NEW JONES & LAMSON SADDLE TYPE 7A UNIVERSAL TURRET LATHE

2½" Bar or 12" Chuck

Rugged, Functional Design, Heavy, Deep, Rigid Bed Gives New Production Efficiency

Full Length Lead Screw:

Carriage and Saddle Threading to Full Turning Length

Wide-Range, Single Lever Thread Selector

All-Sliding Gear Quick-Change Gear Box

Automatic Safety Interlocks on Threading Controls

Power Rapid Traverse for Cross Slide and Saddle—Power Indexing Turret

Lower, Wider Chip Pan with Centrifugal Coolant Pump

12 Spindle Speeds with 20 Horsepower Constant Speed Motor

All Tooling Interchangeable with Previous 7A Models

— ***PLUS*** all the famous Jones & Lamson characteristics of easy operation, versatility and repetitive accuracy!

Built & Powered to Produce *MORE chips per tool, MORE pieces per hour, MORE profit per job*—than any turret lathe of comparable size!

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MACHINE TOOL CRAFTSMEN SINCE 1835

✓ *Write to Dept. 710 for Complete Information*

GLOBAL LETTER

REVIEW OF WORLD MARKETS

British people still suffering from devaluation indigestion . . . Harder work is stressed by all . . . More steel can now be exported . . . Brazil needs foreign capital.

London—Both country and people are still suffering from devaluation indigestion. Officially they were told the cost of living index might rise a point or two by Christmas. Now it is being realized that such a big reduction in the value of the pound against the dollar means a lot more than that.

Workers in the export industries, too, are beginning to measure the task before them. To earn the same number of dollars as before they have to send 42½ pct more goods across the Atlantic. But what is needed is more dollars, not the same number as before.

All Stress Harder Work

The steep rises in prices of nonferrous metals have been eye-openers. There are several other less obvious but equally disturbing items. There has been a run on cotton goods, because it is seen that less cotton may be imported. Coffee drinkers are disturbed to read that the best Empire beans are going to earn dollars. Motorists that gasoline will cost them more, if the standard ration is continued.

Ministerial pronouncement and all industrialists' speeches stress that the only salvation is harder work and more production for the same amount of wages. This lesson has got to be driven home and its truth acknowledged. But it is unpalatable medicine which the worker somewhat naturally is unwilling to take. Some of the workers continue to embarrass their leaders and the government by unauthorized action.

Trade union leaders are not at all happy. As living costs rise they foresee increasing claims for more pay, which they will have to resist if they are to remain loyal to the government they helped to put in power. They are worried, too, by government proposals for directing workers into dollar export industries, wondering how far they can demand safeguards if they accept the principle.

Employment is fully maintained and there is no hint anywhere of a pronounced change. Nevertheless, there is considerable uneasiness. Things aren't so easy to sell as they were and it is becoming obvious in several quarters that the export opportunities offered by devaluation must be seized quickly.

Can Now Export More

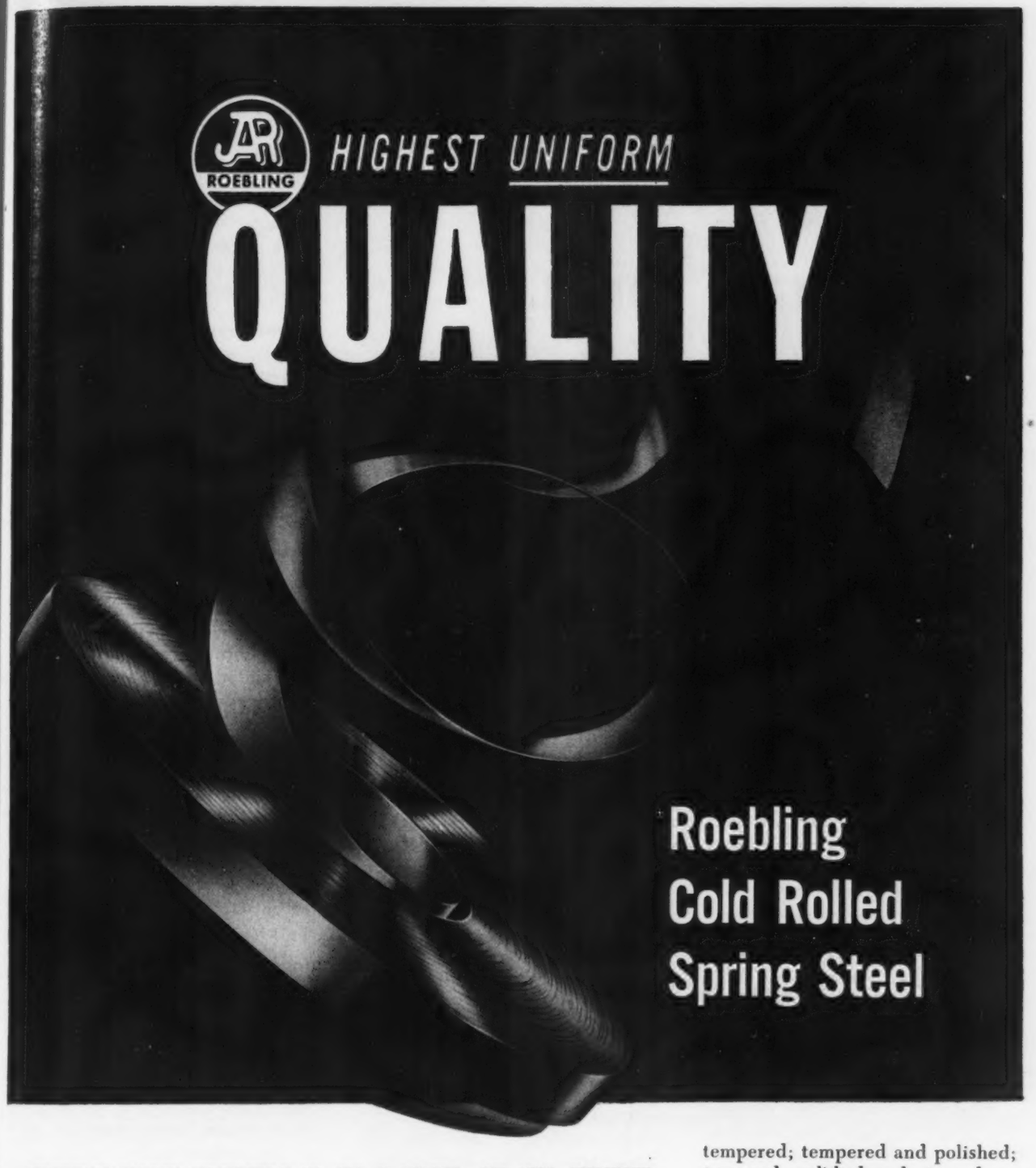
Steel output is very well upheld, but obvious signs have appeared in the last few weeks that the order book position in some products is not what it was. Officially, no fears are expressed. But significant stress is being placed on the fact that Britain has now reached a position where she can spare more steel for export.

About 1½ million long tons of finished steel were exported in 1948. The long-term target agreed between the government and the industry is 2½ million tons. The industry believes that progress toward that figure is now possible from an output standpoint. However, as much or more reliance is placed on boosting indirect exports.

Brazilians Now Realize Need for Foreign Investment

Rio de Janeiro—The Nationalist spirit in regard to the mining industry, which became very strong in Brazil after 1934, now shows signs of weakening. Several of the most ardent Nationalists of recent years have come to realize that the efficient development of Brazil's abundant mineral reserves will call for technical and financial assistance from abroad.

With few exceptions, Brazilian capitalists are not inclined to invest large sums in mining or the industrialization of mineral raw materials, preferring activities which offer a more immediate prospect of big profits. Consequently, while the nationalist legislation of the 1937 Constitution remains in force, excluding foreign participation, the State is forced to intervene in the interests of national economy.



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PRODUCTION SCHEDULES don't go out of kilter . . . you cut down stoppages and rejects when you use Roebling Cold Rolled Spring Steel! For this is a typically Roebling product . . . uniform in physical properties and structure; dimensionally accurate; faithful to the most exacting specifications.

With higher than 0.25% carbon content, Roebling Cold Rolled Spring Steel can be furnished annealed and hard rolled untempered in bright finish. In the higher carbons in this range, it can be furnished tempered, in scaleless tempered; tempered and polished; tempered, polished and strawed; or tempered, polished and blued.

Your Roebling Field Man will be glad to help you select the cold rolled spring steel; round, flat or shaped wire for genuinely superior service and utmost economy in your own products. John A. Roebling's Sons Company, Trenton 2, New Jersey.

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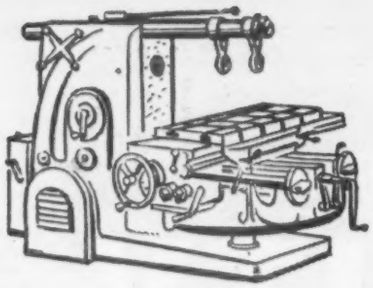
ROEBLING

☆ A CENTURY OF CONFIDENCE ☆



MACHINE TOOL High Spots

SALES, INQUIRIES AND PRODUCTION

by William A. Lloyd

New order volume hit by the steel strike . . . Machine tools needed but buyers are wary.

Cleveland—Optimism was fast becoming a scarce commodity in the machine tool business this week as what appeared to be a pickup in new order volume during the latter part of September proved to be simply another spurt in a spotty machine tool market, according to spokesmen for major segments of the industry.

Preliminary reports on September business indicate a possible 10 pct increase in new firm orders over August, shipments a little under the August level, a decrease in cancellations, and a drop in the backlog of unfilled orders.

Sales Tempo Changes

Most sales executives charged the change in sales tempo during the past 10 days to the steel strike, which could easily last another 30 days. Its effect on the machine tool industry is not the creation of a steel shortage which curtails production, but a chilling of the sales atmosphere.

A few machine tool companies have USW-CIO unions and will be strikebound unless some last-minute agreement is reached to keep the fabricating plants in production.

In the machine tool industry's favor is the fact that production people want and need new machine tools. But management, tussling with pension plans, wage increases, industry-wide strikes and other impedimenta of the welfare state, is not so sure.

New Orders Limited

A case in point is the quotation on some machines which a machine tool builder submitted to a major company about 6 months ago. The proposal reached the executive committee for approval nine separate times and was rejected. On the tenth try it was approved.

In Sidney, Ohio, Jerome A. Raterman, president, Monarch Machine Tool Co., said this week that August appears to have been the low point for his company. Monarch's third quarter net profit totaled $128,319, equal to 61¢ a share, compared with $161,098 or 77¢ a share in the third quarter of 1948. Net sales totaled $1,424,424, compared with $2,008,434 a year ago.

Detroit Suppliers Busy

In Detroit, announcement of the new Ford automatic transmission has emphasized the possibility that the final quarter of 1949 may be extremely busy for machine tool suppliers in this area. At the moment, requests for quotations for a new Chrysler engine have kept the engineering departments of several suppliers going at top speed. Requests for tooling estimates for the new Ford transmission unit are expected to follow in the near future.

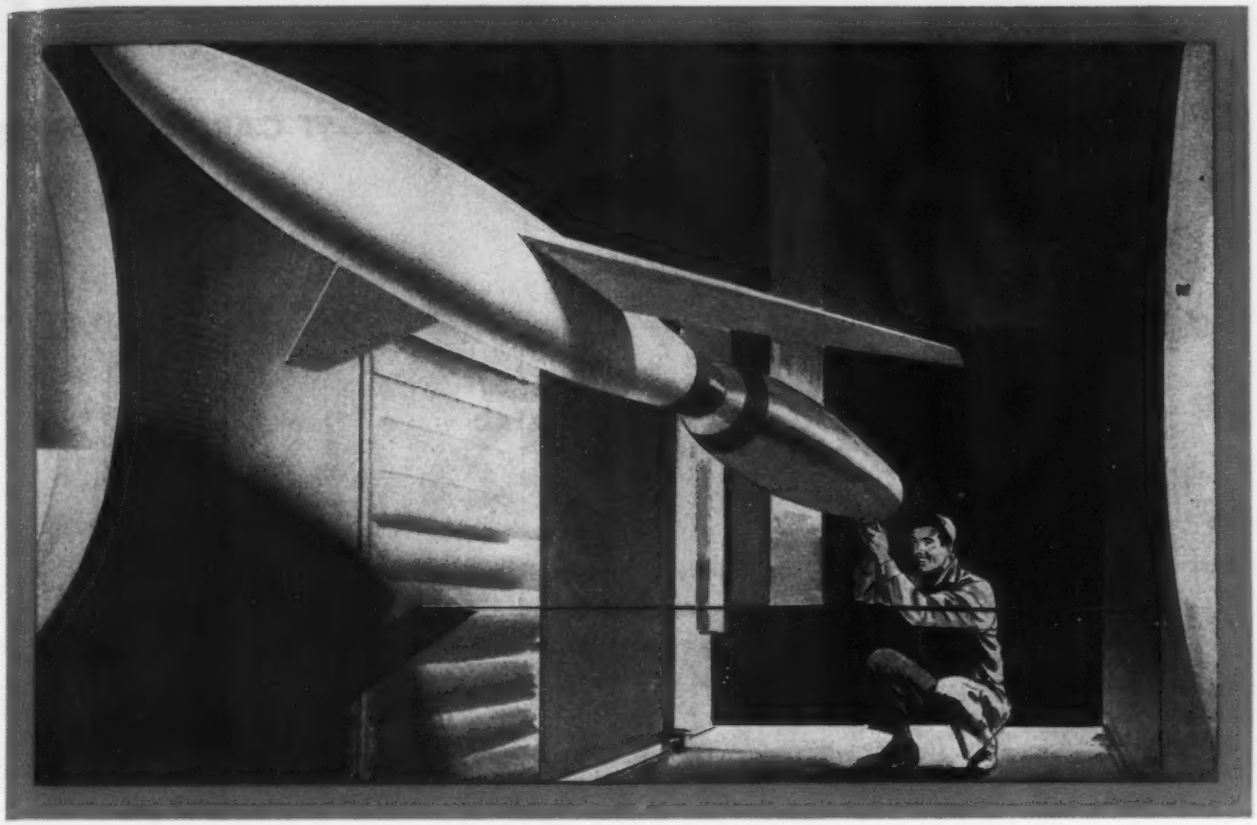
Speculation about the new Chrysler engine, which has recently been transferred to Chrysler-Jefferson from Dodge, runs all the way from a V-6 and a V-8 to two kinds of 8-cylinder engines. Indications are that Chrysler plans to use transfer units on a large scale in a plant that will undoubtedly follow closely the tooling pattern established in the Olds engine plant in Lansing.

Detroit Backlogs Low

As yet, there is no major tooling activity by Kaiser-Frazer. However, it is expected that its recent $34.4 million RFC loan will permit K-F to place a number of new tooling contracts both for product improvement and a possible new model car and engine.

Despite the present flurry of activity, investigation shows that Detroit backlogs, with few exceptions, are not very strong. Particularly in the case of producers of highly specialized machines, buying has been mostly from hand to mouth, according to leading suppliers here.

Latest reports indicate that most of the aluminum die casting equipment for Ford's new plant at Monroe, Mich., have been placed.



Putting Air to Work!

Air will be put to work in this new NACA supersonic wind tunnel in an unusually interesting way. Jet and rocket engines will be tested in this chamber and through it a "gale" of sub-zero rarified *air will be blown at twice the speed of sound.*

Of equal interest also are the many unusual ways DeVilbiss puts air to productive work on countless jobs . . . some commonplace . . . many spectacular. Consider for example the comprehensive line of specialized DeVilbiss spray guns that apply coating materials of every description.

DeVilbiss Flock Guns spray fibers to rival the textures of suede, velour and velvet. DeVilbiss Veiling Guns

spin "cocoon-like" shrouds—over large objects of all kinds preliminary to moisture proof packing. DeVilbiss Automatic Guns

apply remarkably uniform finishes at amazing speed at a fraction of normal costs. And these are just a few of many impressive examples.

Regardless of what your product finishing problem may be, it will pay you to consult a DeVilbiss Engineer. He'll recommend equipment that will increase production and lower costs, whether your specific requirements call for a spray gun or a completely engineered finishing system.

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Canadian Plant: WINDSOR, ONTARIO

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means **Quality** *in all four . .*

DV

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EXHAUST SYSTEMS
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PUBLICATIONS

New publications that describe money saving equipment and services are available free and without obligation. Copies can be obtained by filling in the attached card and mailing it.

Forging Catalog

Catalog 51 describes the forging facilities of this manufacturer and includes technical information, tables, drawings and photographs of their line of forged products. *McNevin-Wilson-Dalldorf, Inc. For more information, check No.* 1 *on the postcard.*

Slitting Machine Shims

How color-coded, durable plastic shims make micrometer - caliper measurements unnecessary in the gap setting of slitting machines is described in 4-p bulletin. *Industrial Products Suppliers. For more information, check No.* 2 *on the postcard.*

Printed Tape

The color, size, and strength specifications along with the industrial uses of Topflight self-adhesive laminated-cellophane printed tapes and labels are listed in 4-p. pamphlet. *Topflight Tape Co. For more information, check No.* 3 *on the postcard.*

Switchboards

The new Lo Ohm line of dead front switchboards, panelboards, and enclosed switches is described in 4-p illustrated pamphlet. *Metropolitan Electric Mfg. Co. For more information, check No.* 4 *on the postcard.*

Hard-Cast Rolls

The use and production records of hard-cast rolls in metal forming operations are available in illustrated booklet 949. Also included are details and illustrations on the hard metal surfacing of parts subject to high abrasion. *Coast Metals, Inc. For more information, check No.* 5 *on the postcard.*

Hair Pin Cotters

Illustrations, details, and specification charts on new line of external and internal hair pin cotters are described in bulletin 620. *M. D. Hubbard Spring Co. For more information, check No.* 6 *on the postcard.*

Air Cooled Motors

A new line of totally enclosed, fan cooled, 50 or 60 cycle, polyphase, constant speed, continuous duty, high torque, ball bearing, squirrel cage induction motors drawing low starting currents are described in pamphlet. *Valley Electric Corp. For more information, check No.* 7 *on the postcard.*

Foundry Machinery

Publication CEC-49, a 36-p illustreated book, lists Patterson foundry equipment and describes the company's activities in the process engineering field. This condensed catalog illustrates and describes grinding, mixing, classifying, processing, hydrogenating, gas absorbing, and heat exchange equipment. *Patterson Foundry and Machine Co. For more information, check No.* 8 *on the postcard.*

Welding Rod Chart

Bulletin CC-3 on hard facing welding rods and electrodes features a selector and comparison chart to simplify the selection of the right rod for the right job. For comparison purposes, competitive electrodes which are the closest equivalents for the service noted are listed along with the metallurgical and physical descriptions of each rod. *American Brake Shoe Co. For more information, check No.* 9 *on the postcard.*

Low Cost Oxygen

The engineering design and construction of low cost oxygen plants for industrial use are described in 12 p bulletin. *Stacey-Dresser Engineering. For more information, check No.* 10 *on the postcard.*

Floor Patching Material

Instant-Use, the floor patching material that has recently been improved by the addition of a new plasticizer, is described in 4-p bul-

Turn to Page 116

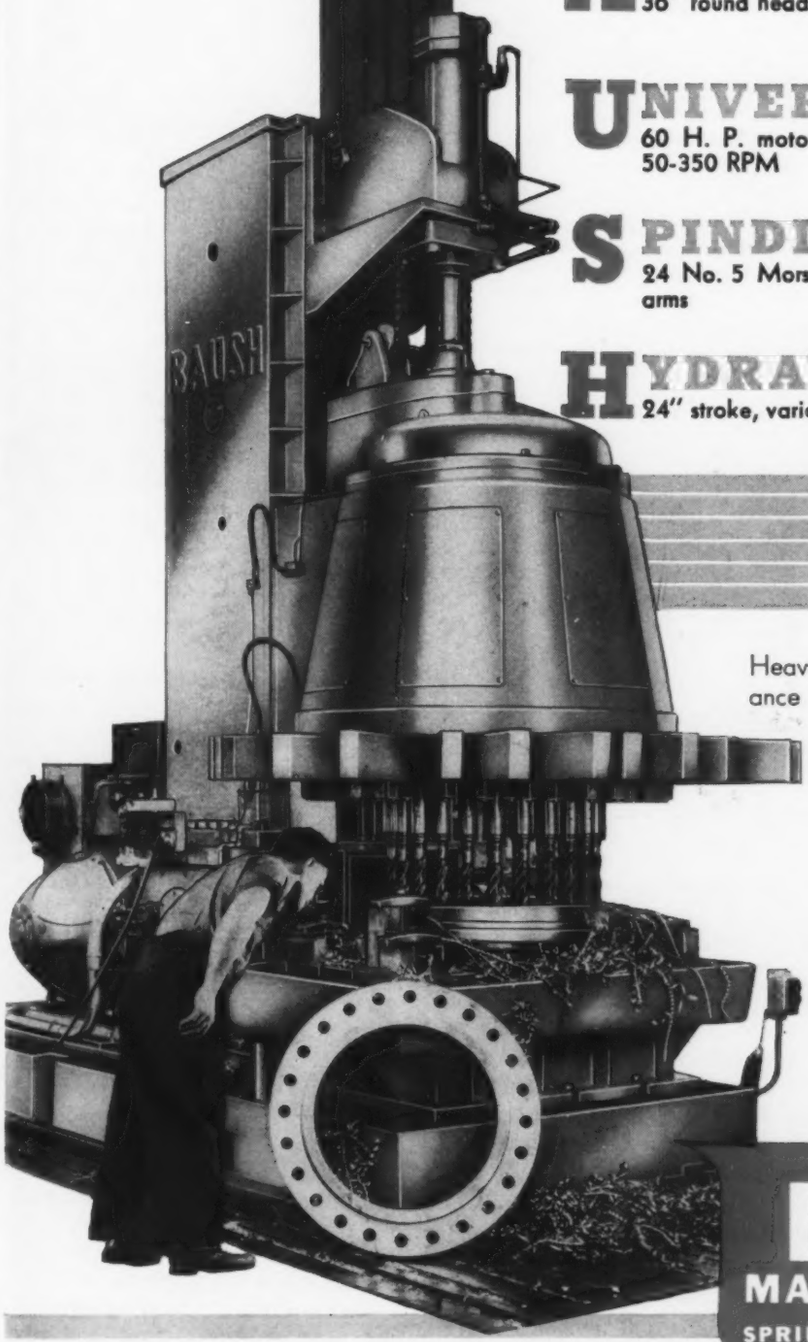
BIG
30 ton (15'4" high x 6'8" wide x 12'5" deep)

ADJUSTABLE
36" round head, joint driven type

UNIVERSAL
60 H. P. motor, spindle speed range 50-350 RPM

SPINDLE
24 No. 5 Morse taper and adjustable arms

HYDRAULIC
24" stroke, variable feed rates



Heavy-duty drilling, with production performance at maximum efficiency, is the result of typical Baush engineering design and rugged construction in this "Super Capacity" Vertical Center Feed Type Hydraulic Multi-Spindle Drilling Machine.

Machine illustrated has 60 H. P. constant drilling capacity.

Consult Baush for solutions to your drilling, reaming, boring or tapping problems.

BAUSH
MACHINE TOOL CO.
SPRINGFIELD 7, MASSACHUSETTS

NEW

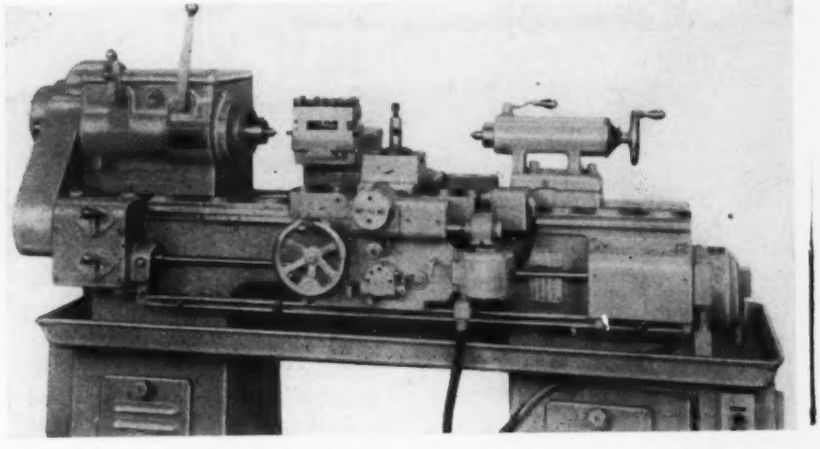
PRODUCTION IDEAS

Continued

bore, with or without adjustable cushions. Round snap rings, seated in grooves in the cylinder body, and steel clamping collars are used instead of tie rods. Advantages include improved appearance; elimination of leakage between the cylinder heads and body; and lack of longitudinal compression stresses of the cylinder body. *Tomkins-Johnson Co. For more information, check No.* 30 *on the postcard on p.* 33.

Automatic Lathe

Ease and simplicity of job setup feature the Clipper, a new automatic high speed manufacturing lathe. For the average turning and facing job, there are no cams to



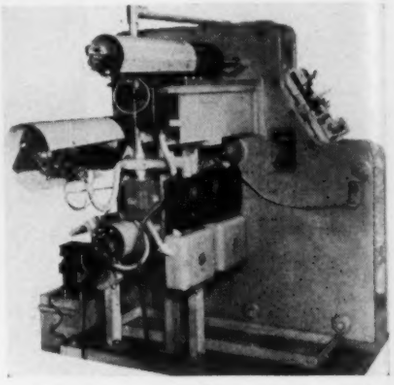
make or change. Starting point is determined by the position of the micro-length limiting switch on the bed. Length and depth of cut are set on positive automatic stops. The machine runs automatically through a complete cycle; plunge to depth, turn, tool relief and rapid traverse to starting position. The Clipper can be used as a semi-automatic or manually operated lathe. With the automatic apron, a cross - feed mechanism moves the tool in and out electrically. Three headstocks are available. One for medium spindle speeds has two ranges of six selective speeds each: 68 to 400 rpm or 102 to 600 rpm. A high speed head has two ranges each with six selective speeds: 200 to 1200 rpm or 250 to 1500 rpm. A high speed motor head has a built-in motor and is furnished with one of nine spindle speed combinations varying from 450 to 3600 rpm. Swing over bed and carriage wings is 14⅞ in. *R. K. LeBlond Machine Tool Co. For more information, check No.* 31 *on the postcard on p.* 33.

Variable Speed Drive

A variable speed transmission for small conveyers is a packaged unit requiring only four mounting screws. It is complete with built-in motor, variable speed drive, and built-in two-stage spur gear reduction. The drive delivers speeds from the desired maximum down to zero and handles conveyors driven with ¼ or 1/3 hp motors. Micrometer speed control permits close speed adjustment to 1/400th of the dial periphery. The Model 20MT is available with a large number of ratios of spur reduction delivering speeds from 110 rpm to 0 to 5 rpm to 0. *Graham Transmission Inc. For more information, check No.* 32 *on postcard on p.* 33.

Production Machine

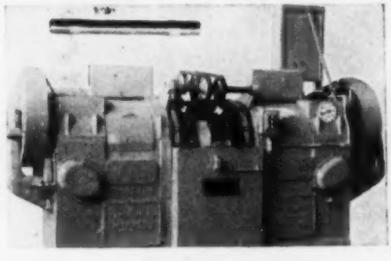
A semi-automatic machine that performs four operations on a bicycle pedal crank employs three drilling units and two tapping units that are operated by air with a hydraulic check for feed control, and built with a patented traversing rotor. A special ¾ hp unit with 6-in. stroke, operating at 1150 rpm, performs a ⅜ in. diam hol-



low milling operation on the driving lug of the sprocket. It has 4 in. non-rotating travel and 2 in. working travel. Two standard units operate at 840 rpm for a combination operation of a 7/16 in. tap drill and ¾ in. diam spot facing of the pedal holes. The last operation consists of tapping the two pedal holes, ½ in. No. 20 thread, one right-hand and one left-hand, with two opposed tapping units. All five units on the machine operate electrically through solenoids and limit switches. *Black Drill Co. For more information, check No.* 33 *on the postcard on p.* 33.

Threading Machine

The Roto-Matic type GG double-end, horizontal continuous threading machine has been adapted to the threading of both ends of suspension arms. The machine has 12 spindles with lead screw feed, carrying six die heads on each end,



making possible the continuous threading of workpieces from both ends. Parts are loaded at the open station while the machine is in operation. They are held by equalizing jaws in the fixture and die heads are fed on to the workpiece.

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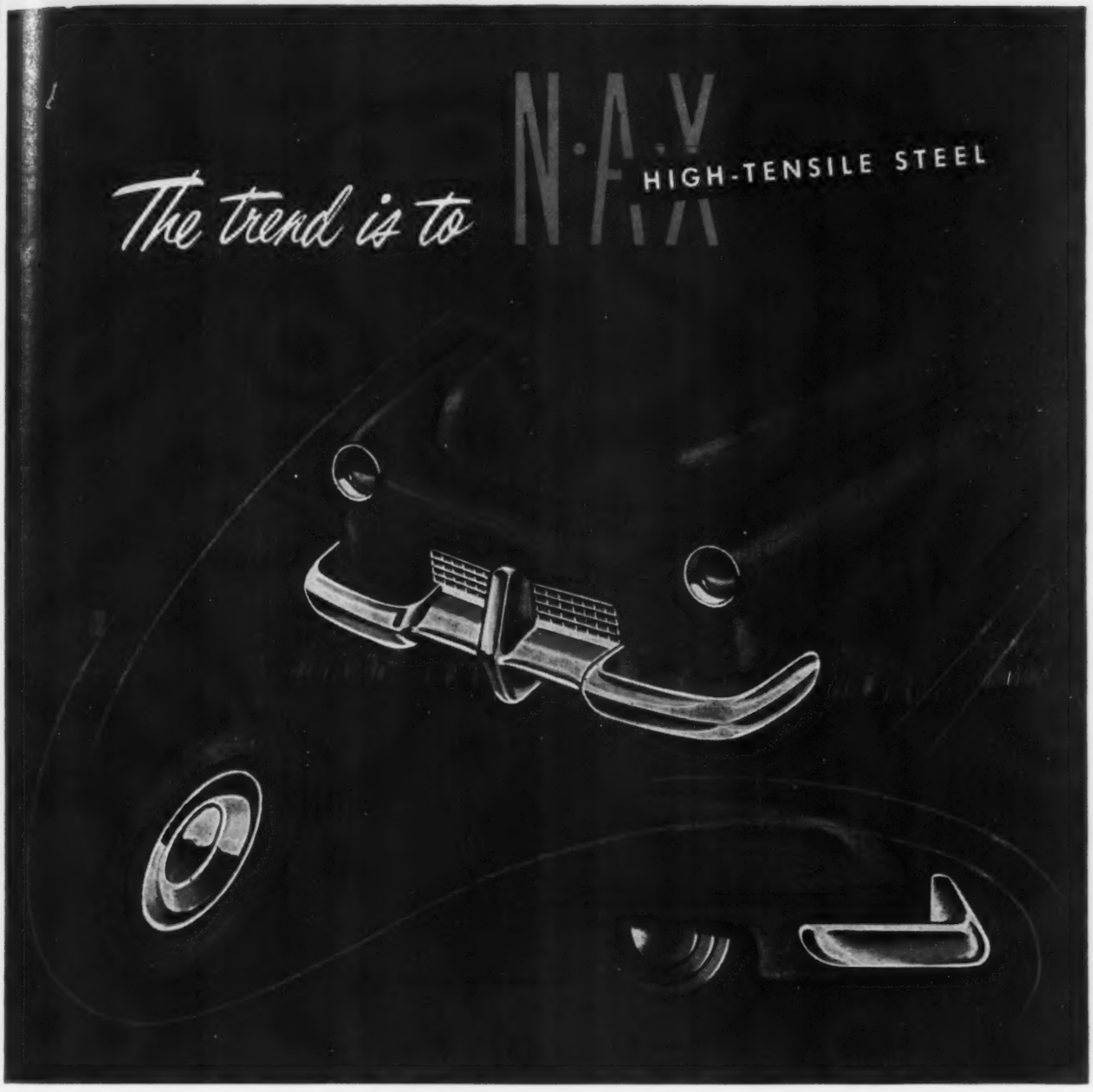

Since 1940, when Great Lakes Steel pioneered the application of high-tensile, low-alloy steel to cold-stamped automobile bumpers, there has been a growing trend to N-A-X HIGH-TENSILE steel in the automobile industry.

Today, every car manufacturer is using the inherent better properties of N-A-X HIGH-TENSILE steel for some part of his automobile.

Bumpers and grilles—hoods and fenders—body panels and deck lids—frames and bracings—wheels and hub caps represent a few of many applications of N-A-X HIGH-TENSILE steel to the modern car.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
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N-A-X HIGH-TENSILE MEETS ALL REQUIREMENTS OF S.A.E. 950

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Unit of National Steel Corporation

On the ASSEMBLY LINE

AUTOMOTIVE NEWS AND OPINIONS

Ford automatic transmission will reach the public next summer . . . New unit features air cooling, simplicity and high economy . . . K-F builds its first small plant.

by Walter G. Patton

Detroit—There's a Ford automatic transmission in your future! This is now official. It's only a coincidence (it says here) that the new automatic transmissions will be delivered in quantity in 9 months.

Ford Reacts to Rumors

Two car producers have now disclosed the design of their self-shifting devices several months ahead of actual production. Early last summer Packard announced its ultramatic transmission. Quantity production of these units has still not been attained. Last week Ford took a similar step by announcing its new automatic shifting unit at least 9 months ahead of volume production.

Ford explained that the rumor factory had been grinding out reports about its new transmsision so fast it had little choice if it wanted to see that the record was kept straight. The company may also have had in mind the fact that Chevrolet is already in experimental production on its new automatic transmission, scheduled for introduction later this year. Thus far, Chevrolet is sitting very tight on the details of its design.

Early next spring Cadillac is due to announce a major change in its Hydra-Matic unit. To many observers here, it looked like GM simply pulling too far ahead of the field. By announcing now, Ford hoped to show that its new transmission was well worth waiting for.

Unit Has Less Parts

Ford also left some elbow room for itself by announcing a price of "less than $150." Chevrolet has given no indication of the price of its new unit but reports as low as $100 have been heard. These seem to be unrealistic, in view of the fact that a standard transmission plus overdrive sells from $87 to $105.

The new Ford unit was introduced at Dearborn Inn last week by Harold Youngren, Ford vice-president and former chief engineer of Olds and Borg-Warner. A standard three-speed transmission has 240 parts, he pointed out. The addition of an overdrive increases the number of parts to 340. Hydra-Matic has more than 900 parts, Mr. Youngren explained. He did not disclose the number of parts in the new Ford unit but said there were "several hundred" less than the number of parts in some competitive designs.

The new transmission for the Ford and Mercury has been developed jointly by Ford and Borg-Warner engineers working together during the past 4 years. The following claims were made for the new unit: (1) Completely automatic shifting; (2) better fuel economy than is available from a standard synchromesh transmission set; (3) immediate shifting from forward to reverse without waiting for mechanical engagements; (4) design to permit manufacture at low cost; (5) a completely air cooled unit requiring no oil cooler or its connections; (6) simple servicing; and (7) lower weight than any other unit on the market today.

Unit Similar to Buick's

Ford will make some of the units, but probably not at the Rouge. Borg-Warner will build similar units at Muncie, Ind. This will permit the sale of these transmissions to other car makers although nothing has been said officially about any such arrangement.

In operation, the new Ford unit

TAP LIFE INCREASED..

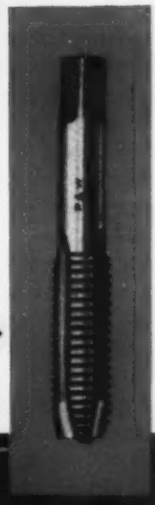
TOOL COST DECREASED..

with

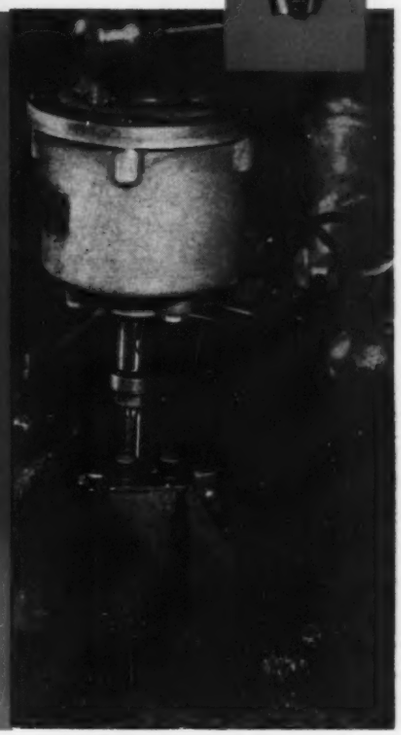
P&W TAPS

Here are two widely separated jobs that *prove* there's a difference in Taps. In each case, the comparison is based on the same operation, the same material, the same machines. The only difference — *and a BIG difference* — is in the "*make*" of Tap. P&W "know how" in design, precision manufacture and special treatment gives more tapped holes per Tap — a plus factor on any job.

On this job: P&W ½" — 20 NF, HSS Commercial Ground Thread Bottoming Hand Tap, specially heat treated for the job.



On this job: P&W 5/16"—24 NF, HSS Commercial Ground Spiral Point Plug Hand Tap, given our special heat treatment.



HERE'S ONE INSTANCE

Tool engineers in a midwest plant couldn't overcome excessive tap wear on a zinc die casting job — until they changed over to P&W TAPS. Under the same conditions, P&W stock taps (specially treated) produced many times the number of tapped holes per grind . . . in fact TAP LIFE INCREASED OVER 300%

. . . HERE'S ANOTHER

A New England tool and die company had been tapping in cold rolled steel, obtaining only a few thousand holes per tap. P&W TAPS were applied to the same job with the same equipment. RESULT: TAP LIFE INCREASED 270%

It pays to buy Taps on a Performance Basis

Pratt & Whitney

Division Niles-Bement-Pond Company
WEST HARTFORD 1, CONNECTICUT

P&W TAPS

Branch Offices and Stocks: Birmingham, Boston, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Seattle

has many points in common with the Buick Dynaflow although construction and gearing details are vastly different. The Dynaflow has a five-piece converter unit whereas Ford has a three-piece unit. The Packard Ultramatic converter has four major converter components. Unlike the Packard unit which locks mechanically into high gear, the new Ford unit (like the Buick) will drive through a fluid coupling.

Design for cooling and construction of the Ford pump unit are unique thus far in the automatic transmission field. The pump unit will be an aluminum die casting with steel blades inserted. Ford is silent about whether it will braze the blades in place or insert them in the molds before casting. A number of prominent fins are cast on the surface of the outer pump unit to facilitate cooling. Heat escapes through three openings in a cast iron housing on the present design which, Ford engineers have explained, may later be changed.

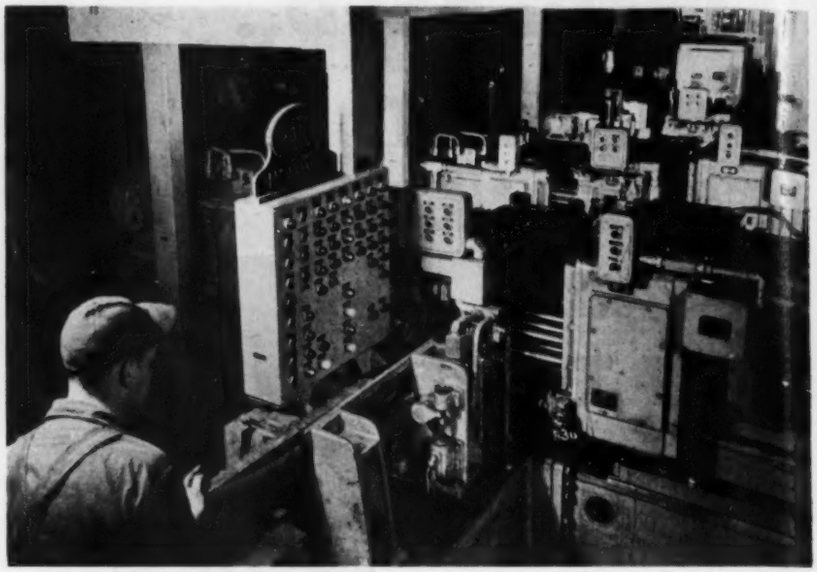
The stator and reactive member of the torque converter will be die cast units. If the units are aluminum they may be made at the new die casting plant Ford is readying at Monroe, Mich., formerly owned by Kelsey Hayes. The company recently purchased this plant.

K-F Moves Ahead With Its Portland Assembly Plant

Kaiser-Frazer is moving steadily ahead with its plans for decentralization. Last week K-F announced construction of a $350,000 assembly plant at Portland, Ore., capable of building 20 cars per day. The plant will employ approximately 100 workers.

This is the first small plant on the West Coast where K-F plans to initiate its decentralized assembly operations.

The Long Beach, Calif., unit is somewhat larger than the new unit K-F is building at Portland and was acquired sometime before the present setup of small plants was started. The Portland plant is scheduled for completion early in 1950. Prime-coated bodies will be shipped from Willow Run, 16 to a carload. The bodies will be enameled and trimmed at Portland.



PUSH BUTTON MACHINING: Standing at the loading end of a 40 ft long Natco for machining cylinder heads at the Pontiac Div. of GM is the operator who can promptly detect a tool failure merely by watching the control board. This single integrated machine in which the work moves automatically through four stations has 89 operating spindles.

Transfer Machine Plays An Important Role in Industry

The so-called transfer machine, in which the work passes automatically from one machining station to another is not new, although every installation is new in the sense that it must be planned to the last detail to do a specific job. Not only must the new machine do the work better and faster and at lower cost; it must also conform to the highly individual ideas of plant master mechanics about such things as idle stations and adaptability of the equipment in the event of a model change.

A good example of a successful transfer machine installation is the line recently installed by Pontiac to machine its cylinder heads. In the earlier installation, drilling and tapping operations were performed by a number of operators on a series of machines equipped with multiple drill heads. Cylinder heads were pushed by hand along roller type conveyers; they were then moved into position and located individually by the operator.

In its new line shown in the figures, Pontiac is using a single Natco unit to replace eight of the old machines. The new installation requires only a loader and an unloader. The machine is rated at 65 per hr at 80 pct efficiency. This machine is 40 ft long and has 89 spindles. There are four work stations and three idle stations.

STA.	POSITION	OPERATION
1	R. H. Head	Drill 2 locating holes
	R. H. Head	Drill 15 bolt holes
	R. H. Head	Drill 2 water circulating holes
	L. H. Head	Drill 8 spark plug holes
		Drill 1 heater connecting hole
		Drill 3 tap holes
		Tap drill 2 water outlet holes
2	Idle Station	
	R. H. Head	Drill 7 water circulating holes
		Drill 13 bolt holes
	L. H. Head	Spotface and chamfer 8 spark plug holes
		Drill 2 bolt holes
		Chamfer 35/16-18 holes
		Chamfer 2 water outlet bolt holes
	Idle Station	
3	L. H. Head	Drill 1 core plug hole
	Verticle head	Tap drill 1 thermogage hole
		Tap drill 2 bracket holes
	Idle Station	
4	L. H. Head	Tap 8 spark plug holes
		Tap 1 heater hose hole
		Tap 3 bracket holes
		Tap 2 water outlet bolt holes
	Vertical head	Tap 2 ign. wire manifold bracket holes
		Tap 1 thermal gage hole

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THE FEDERAL VIEW

THIS WEEK IN WASHINGTON

Recently enacted military assistance program represents 50 pct of aid furnished . . . First session of 81st Congress accomplished a great deal . . . Turkish air program vital.

by Eugene J. Hardy

Washington—The recently enacted $1.3 billion program of military assistance for the Atlantic Pact nations and others covered by U. S. foreign policy aims, deemed necessary to arm these nations against Communist attack, is actually only a drop-in-the-bucket when compared with the amount of military assistance already furnished by the U. S.

The $1.3 billion, covering the first year of projected military assistance, is only about 50 pct of the military aid already furnished. Since V-J Day, available records show that the United States has furnished military equipment to the nations covered by the new MAP which cost the United States a little more than $2 billion. These nations paid $79 million for this material. If aid furnished to Latin-America and other nations outside the program, such as Poland, Switzerland, and Sweden, is added, the total swells to almost $2.2 billion, for which the United States received about $90 million. Of the nations eligible for aid under the new program, only Portugal and Luxembourg have not received any military help to date.

However, the above figures are only partial, since untold hundreds of millions can be added due to large bulk sales of ammunition and other equipment on which no accurate accounting is available. In addition, the United States turned over large quantities of captured enemy equipment. Also not included in these estimates are large quantities of equipment other than combat material, trucks, clothing, etc.

The material was transferred to these nations by means of direct sales, specific Congressional authorizations, and direct transfers on orders from the President. The United States also advanced some of the funds used for payment. Sales were at bargain prices and in all cases only a fraction of the procurement cost.

War Materials Given

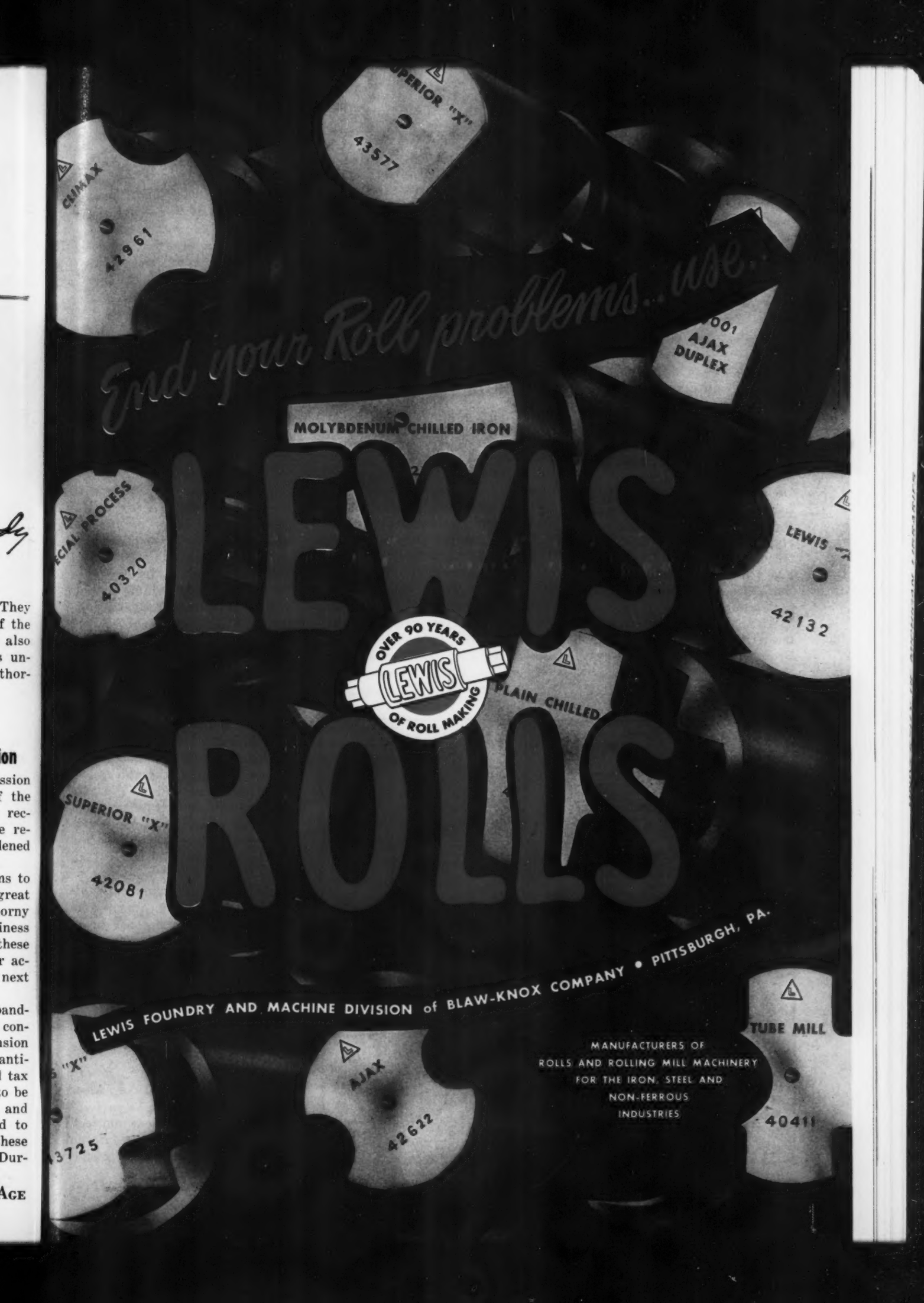
The material transferred to the nations who will soon begin to receive additional aid included aircraft, vessels, ammunition, armored vehicles, radar, light and heavy artillery, ordnance material, small arms, and vehicle and other spare parts. The nations receiving the largest amounts of this equipment were Italy, France, China, and the United Kingdom. They will receive a major share of the new aid. Greece and Turkey also received substantial amounts under specific Congressional authorization.

Congress Adjourns After The Longest Peacetime Session

Adjournment of the first session of the 81st Congress, one of the longest peacetime sessions on record, should bring considerable relief to the already over-burdened American businessman.

This Congress, despite claims to the contrary, accomplished a great deal. While it avoided many thorny issues of vital interest to business and industry, a number of these measures are sure to get floor action during the second session next January.

Many proposals, such as expanded social security with higher contributions, extension and expansion of unemployment benefits, anti-merger legislation, and revised tax legislation are almost certain to be enacted next year. Business and industry would have screamed to high heaven about many of these proposals a dozen years ago. Dur-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ing the session just concluded the expected opposition did not materialize. It must be pointed out, however, that lack of opposition was due, in large measure, to the fact that it was generally conceded that the first session would not complete action on these proposals. The voice of business and industry must be heard at the next session, unless American industrial leaders are willing to settle for Administration-backed proposals which may or may not be in the public interest.

Must List Still Long

Other measures which the second session will be actively considering include a program of national health insurance, federal aid to education, establishment of a national science foundation, establishment of the Columbia Valley Authority, new labor legislation, civil rights, and several credit measures. All of these are on President Truman's must list and didn't get much beyond the committee stage in the first session.

While the second session has left much undone in the eyes of the President, it has also enacted many measures which are covered by Mr. Truman's "Fair Deal." Included are "strengthening" of the military unification act, military pay raise, executive pay raises, continuation of the Marshall Plan, the military aid program, extension of the reciprocal trade act, the North Atlantic Pact, compromise agricultural price supports, export controls, power to reorganize the government, rent control, and advance planning for public works.

Turkish Aid Program Takes on Strategic Aspects

An interesting sidelight on the general subject of foreign aid can be found in the Turkish aid program. In recent weeks it has become increasingly obvious that there is more behind this program than the stated purpose of helping the Turks defend themselves against the onrush of Communism. While the Turks have received substantial military aid and will be granted even more, Marshall Plan aid to this small nation is also taking on strategic aspects.

One reason is that Turkey may turn out to be an important, though relatively small, source of strategic materials — particularly manganese and chrome.

Russia, an important exporter of these two materials in the past, more recently has become increasingly unreliable as a U. S. supplier.

Resources Not Developed

Turkey's potential for both these critical materials is yet largely to be determined although she now produces some chrome ores. There are known undeveloped deposits of manganese in the country, and it is hoped that they will prove quite large.

But these have to be proved and developed, and it is here that Marshall Plan aid figures prominently. Half of Turkey's postwar budget has had to go into defense and military spending, leaving little, in effect, to help in industrial and capital investment assistance.

The ECA is tackling the problem in two ways. One is a plan to help expand present chrome production facilities and to investigate the extent of the manganese deposits. The other is to lend a hand in industrial development of this hitherto largely agricultural nation. Most of the $30 million allotted to Turkey through June 30 consisted of goods in the machinery and equipment category.

A major handicap to industrial and mining development has been the lack of adequate power facilities. To this end, Turkey has embarked upon an ambitious and long-range program. Among other things, it calls for intense hydroelectric development with establishment of stations in various areas of the nation over the next 4 years.

THE BULL OF THE WOODS — By J. R. Williams

Studies Combustion Engines

Washington—A British productivity team is scheduled this week to begin a round of visits to American industrial plants as part of a 6-week study of methods and techniques used in making internal combustion engines.

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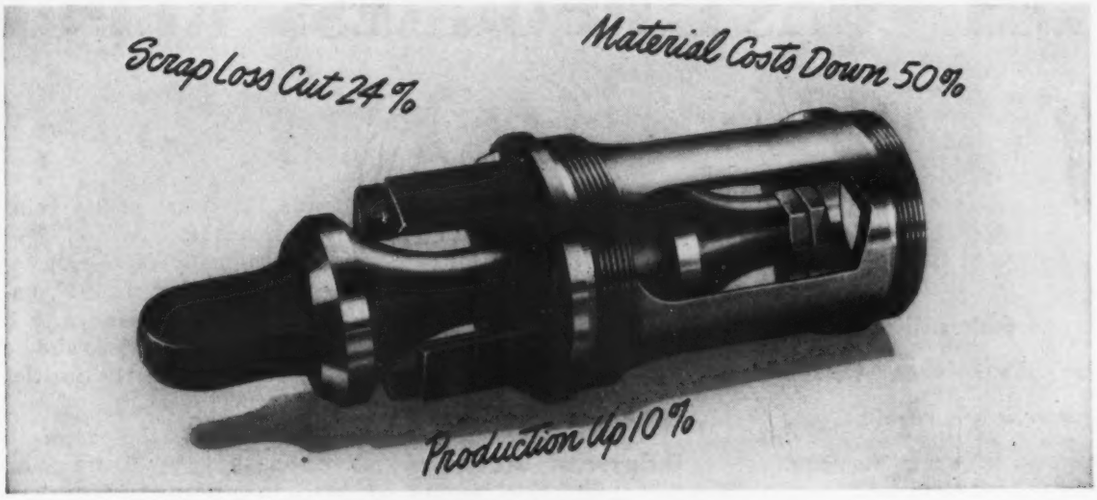

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WEST COAST PROGRESS REPORT

Steel trade finds a little to be cheerful about even though gloom generally prevails . . . Kaiser blows in second furnace.

Digest of Far West Industrial Activity

by J. P. Reinhardt

San Francisco — Labor pains now tormenting western industry, while probably less severe than in other areas, are taking their toll in wages and lost production. Consensus among top steel executives seems to be that regardless of the outcome neither labor nor management will have grounds to be proud of being the sire.

Throughout the West a number of fabricating and metal working plants have already added to the unemployed rolls following termination of contracts last week and several large construction and pipe line jobs will probably soon have to shut down.

Some Bright Spots Appear

A few bright spots appeared last week on the industrial horizon; the ruling of the ICC making the temporary rates in effect from Geneva to Pacific Coast points permanent; the blowing in of the second blast furnace at Kaiser Steel Corp. plant; continued relatively high ingot production (approximately 24 pct); announcement of start of construction on the Kaiser-Frazer assembly plant at Portland, Ore.; and the prospect of some West Coast shipyards repairing 53 government ships now in the reserve fleet.

Despite heavy buying, warehouses report reasonably good stocks of most items with sheet at a premium. However, in Los Angeles where it was anticipated that an effort would be made to increase steel warehouse prices 30¢ per hundred lb on an average, it appears that the plan is being abandoned temporarily at least.

ICC Authorizes Lower Steel Freight Rates Be Made Permanent

Salt Lake City—Many segments of western industry were made a little happier last week by the Interstate Commerce Commission decision authorizing the temporary steel freight rates from Geneva to Pacific Coast points being made permanent.

Originally these rates were established Apr. 1, 1947, on a temporary basis: Geneva to Los Angeles, San Francisco and Portland, $12.60 per ton; to Seattle, $14.00 per ton.

Although the rates initially published by Denver and Rio Grande Western, Western Pacific, Union Pacific and the Great Northern have been upped by more than 50 pct, the increases have been general and have not substantially changed the competitive situation.

Dr. Walther Mathesius, president of Geneva Steel Co., said the ICC decision assured the company of a competitive position in the market where it must dispose of a large part of its output.

Other western steel producers have been leading the fight against these lower rates as have some eastern producers. Considerable credit for the establishment of these lower rates is being given Western States Council which represented steel buyers and fabricators on the Pacific Coast.

Mining Outlook Doubtful

Salt Lake City—A special survey of the Utah mining industry by the state department of employment security produced some glum conclusions so far as employment is concerned. The department anticipates that there will be some upswing next spring but doubts that it will be great enough to off-set the sharp declines experienced thus far in 1949.

The survey indicated that open pit copper mining operations can probably be maintained at present

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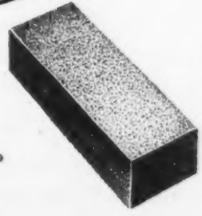

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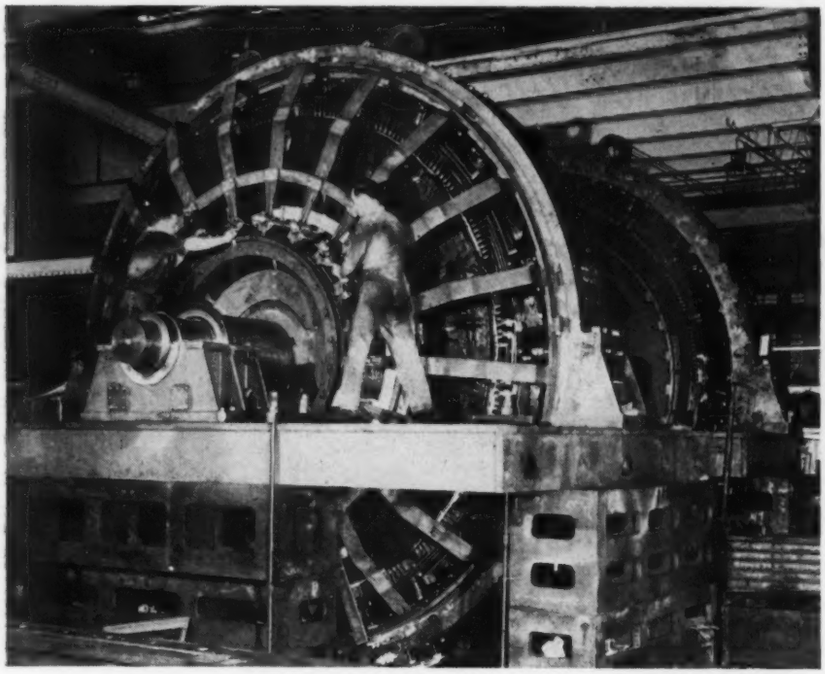

MORE SHEET STEEL: Two huge drive motors for the West Coast's first semicontinuous hot strip mill are being prepared for testing at General Electric's Schenectady works. Rated at 5000 hp each, the motors are part of the equipment for the new Kaiser steel plant at Fontana, Calif. When the new Kaiser mill is completed about Jan. 1, 1950, it will be used to produce steel for welded pipe and for other products requiring heavy gage sheet steel.

levels but that there is a "near exhaustion" of lead and zinc ore which cannot be profitably handled under existing price conditions.

Kaiser Dominates Steel Market; Blows In Blast Furnace

Los Angeles—New strikes and timely construction have placed Kaiser Steel Co. in an advantageous position to dominate the steel market on the West Coast for the duration of the walkouts. If the situation is handled right the Kaiser mills may come out of the crisis far better off than ever before.

As expected for weeks, two subsidiaries of U. S. Steel; both the Vernon and Maywood plants of Consolidated-Western Steel Corp. and the Boyle Div. of U. S. Steel Products here went out on strike following the expiration of contracts on Oct. 14. This added 2400 men to the local list of unemployed awaiting an eastern solution to the problem. The South San Francisco, Berkeley, Fresno, and Bakersfield, Calif., and Phoenix, Ariz. plants of Consolidated are AFL and are still operating. The Alameda, Calif. plant of Boyle employing 150 is closed.

One effect of the Consolidated-Western strike is that plate under contract from Kaiser Steel Corp., which is not strike bound, to Consolidated for the construction of Transcontinental Gas Co. pipe, probably will be diverted to the open market after some is stockpiled.

Pig Production Doubled

Under the terms of its contract, which enabled Kaiser to finance a second blast furnace, most of the plate turned out in Fontana had been hauled to Consolidated recently for the pipe line. This involves about 25,000 tons monthly. The blast furnace which had been financed through the deal was blown in last week and will produce at capacity 1200 tons of pig iron daily which doubles the iron production. Construction of the second furnace required 10 months and it has been named "Bess No. 2" after Mrs. Henry J. Kaiser.

A number of refinements, which are the result of 6 years of operation of "Bess No. 1" have been included in the design of the new unit. The three stoves are only 100 ft high as compared to 115 ft height of the first set of stoves which reportedly will effect operational economy.

Less Slag Being Produced

It is also stated that because Eagle Mt. iron ore now being used in Fontana's blast furnace produces less slag than most ores, the length of slag pits has been reduced from 500-ft to 400-ft. A new battery of 45 Kopper-Becker byproducts coke ovens are also now in operation giving Fontana 135 ovens with an annual capacity of 515,000 net tons of coke.

Increased production of iron at the Kaiser plant will have a considerable effect on easing the demand for scrap in the Los Angeles area where it has been tight for several months.

Henry J. Kaiser termed the completion of this blast furnace as representing "a tremendously important development in the industrialization of the West." "I am confident it is only the beginning of an even greater steel center in California and will be followed by further phenomenal expansions in manufacturing and commerce."

Air Transports Discussed

Los Angeles—Development and needs of air transports for both military and commercial use were the principal subjects discussed at the national aeronautic sessions of the Society of Automotive Engineers held in Los Angeles.

Engineers heard talks indicating that transports of tomorrow need be versatile and probably will continue to be propellor driven for at least 6 or 7 years.

"Jet transport planes will not be carrying passengers on U. S. scheduled airways much before 1955, despite current availability of British and Canadian models," Carlos Wood, Douglas aircraft designer said.

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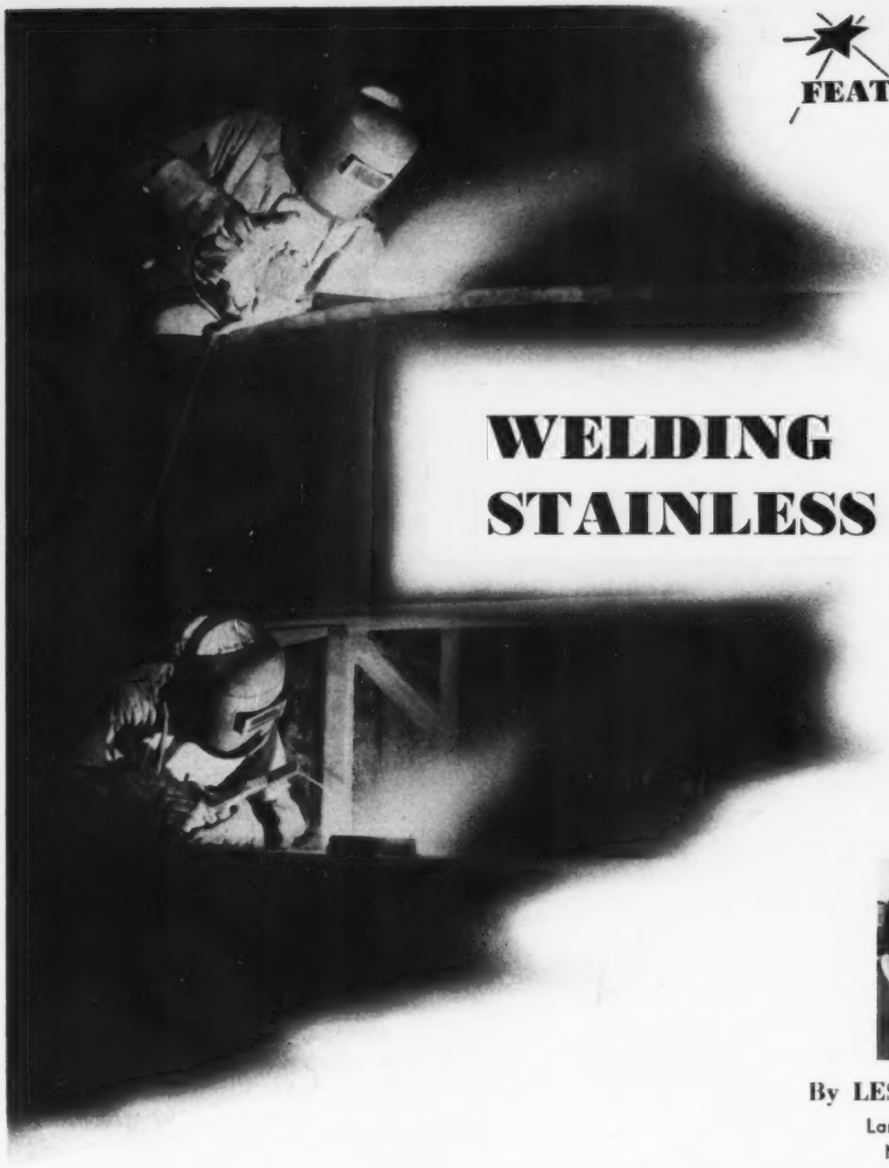

WELDING STAINLESS STEEL

By LESTER F. SPENCER
Landers, Frary & Clark
New Britain, Conn.

STAINLESS steel analyses have been adopted for industrial purposes because of their ability to resist corrosion and oxidation. Generally, this ability is proportional to the chromium content of the alloy. Steels containing chromium as a major alloying element include both the martensitic or hardenable grades and the ferritic or nonhardenable grades. Steels containing both chromium and nickel as major alloying elements are the austenitic or nonmagnetic steels. Other alloying elements are added to the basic compositions to increase corrosion resistance, weldability, physical strength and machinability, as well as improve workability of the steels.

A molybdenum addition, such as in AISI types 316 and 317, materially increases corrosion resistance, while titanium and columbium additions, as in types 321 and 347, increase weldability by overcoming harmful carbide precipitation so characteristic of the other austenitic compositions. Each type of stainless steel, austenitic, martensitic and ferritic, has

SUMMARY: While the various types of stainless steels can be welded well and with considerable facility, certain basic precautions must be taken for the successful application of this fabrication method. Behavior of stainless in the various resistance, arc and gas welded techniques and some practical recommendations for assuring success in welding stainless are discussed in this two part article.

a counterpart alloy, the composition of which is adjusted to provide free machining qualities.*

The austenitic or 300 series steels are more readily and satisfactorily welded than the straight chromium compositions. The welded joints are strong, ductile and tough in their as-welded condition, and require no subsequent heat treatment or anneal to improve physical properties. Maximum corrosion resistance, the factor of most concern, is realized when the material exhibits the normal austenitic structure. However, upon the application of heat as encountered in any welding procedure, carbide precipitation occurs along the grain boundaries, the extent depending upon several factors, which include: (1) The length of time the material is held within the carbide precipitation temperature range. (2) The closer the temperature of the affected area is to 1200°F, the more harmful will these carbides become. (3) The chromium-nickel steels with higher carbon are most susceptible to the formation and precipitation of these carbides than steels of lower carbon content. (4) The greater the combined chromium and nickel in proportion to the amount of carbon in the analysis, the less rapid will be the formation of these carbides.

Carbides form between 800° and 1500°F. If the material is heated within this range, the carbides separate from solid solution (austenite) and form on the grain boundaries. Around each formed carbide particle is a region depleted of chromium. Since corrosion resistance of the metal depends on the chromium, these depleted areas are subject to corrosive attack. Stabilizing elements, columbium and titanium, are used because they have a greater affinity for carbon, and will combine to form either titanium or columbium carbide, permitting the austenite to retain the chromium and its corrosion resistance.

Carbide precipitation is a function of time and temperature. For example, in resistance welding unstabilized stainless, such as type 302, the spot weld will be at welding heat a predetermined length of time. The temperature gradient will drop radially from the spot weld, and there will be a zone between the weld nugget and the extreme cold ends that will be in the carbide precipitation range of 800° to 1500°F.

Curve a in fig 1(A) shows the welding heat a little over 2700°F. The area adjacent, represented by curve b, is at a lower temperature, but still above the carbide precipitation range. The third zone, curve c, has conditions favorable to precipitation of carbides since not only is this zone within the carbide precipitation range, but the total elapsed welding and cooling time is sufficiently long to permit the development of these carbides. The area beyond the third zone is unaffected since the temperature does not reach even the lower limit of the carbide precipitation range. The development of this carbide zone can be prevented by reducing the welding time and permitting the material to cool more rapidly, as illustrated in fig. 1.

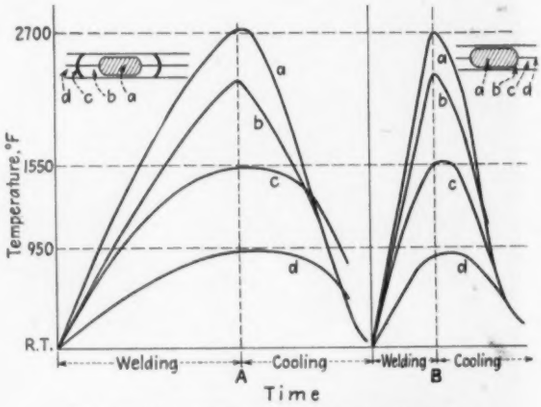

FIG. 1—The welding time and rate of cooling have a definite effect on carbide precipitation in the weld zone. *A* shows a long welding time and slow rate of cooling, while *B* shows a short welding time and rapid cooling rate, which prevents carbide formation.

Carbide precipitation can be minimized or completely eliminated by other methods. One method is to select a stainless analysis of low carbon content. Type 304 with 0.08 pct max C is often preferred to type 302 with 0.20 pct max C since the percentage of carbides present in an affected zone depends upon the carbon in the steel. A widely used method of eliminating carbide precipitation is by annealing where this can be done without undue distortion. Annealing consists of soaking thoroughly at 1850°F, and quickly cooling to below 800°F, or the lower range of the sensitization region.

Where annealing is not possible because of structural design, an immunizing heat treatment is ofen preferred. This consists of heating the welded structure to 1300° to 1500°F for a sufficient period of time that chromium diffuses into the depleted areas and carbides coagulate. This treatment breaks the continuous path of the carbides formed during welding so that excessive corrosion will not occur. It is only satisfactory on a completely welded part prior to its introduction into service. While immunizing efficiency is not as great as that of annealing, it is practiced in the production of large welded pressure vessels that are difficult to quench uniformly and impossible to quench without internal stress concentrations.

* *See "Machining Stainless Steel," by Lester F. Spencer,* THE IRON AGE, *July 7, 1949, and July 28, 1949.*

Stabilized stainless grades, types 321 and 347, are widely used, particularly in aircraft where complete freedom from intergranular carbides is required. This is especially true when the welded component must perform at elevated temperatures.

Austenitic stainless steels react somewhat differently to welding heat than straight carbon steels. The specific effects can be understood better by comparison. Characteristics to be considered are expansion, heat conductance, electrical resistance, melting point and grain size control.

Austenitic steels expand about 50 pct faster than carbon steels, which means that greater distortion or warping allowance must be made. They conduct heat only about half as fast as plain carbon steels. Heat remains longer in one place and the work cools off more slowly. Because heat is not rapidly conducted away, higher temperatures will be reached in comparatively small areas near the weld joint, and, because the coefficient of expansion is high, there will be a tendency toward greater distortion and residual stresses. The electrical resistance of austenitic stainless steels is about six times that of carbon steels. If the stainless is heavily cold worked, electrical resistance may be 12 times higher. This higher electrical resistance means that somewhat lower welding currents can be employed. The melting points of the stainless steels are somewhat lower than those of plain carbon steels, meaning that less heat is required to melt them.

Austenitic stainless steels are single phase alloys, and no corrective measures can be employed, such as heat treatment, for reduction of grain size. Annealing procedures can be used only to soften and relieve stresses within the welded structure. If the grain size is increased by high temperatures, such as employed in welding, there is no way to reduce the grain size with the exception of working.

Chromium steels are more difficult to weld than austenitic steels. They are hard and brittle after welding, and annealing subsequent to welding is usually necessary to improve their mechanical properties. Chromium steels are considered to be stable at all temperature ranges and not subject to the same type of carbide precipitation as the austenitic grades. Consequently, they do not suffer loss of corrosion resistance because of welding.

As with austenitic grades, the behavior of straight chromium stainless compositions under the influence of heat can be best understood by comparing them with plain carbon steels. The coefficients of expansion of these analyses are about the same or slightly less than those of carbon steel. Heat conductivity is less than in carbon steels, ranging from one-half to two-thirds and resulting in a greater retention of welding heat. Electrical resistance is greater, varying from three to six times that of carbon steel.

There are three types of straight chromium stainless steels. First are the grades containing less than 14 pct Cr, usually referred to as martensitic steels. These are intensely air hardening and excellent mechanical properties can be obtained from heat treating subsequent to welding. The second group includes compositions with a chromium range from 15.0 to 18.0 pct. Hardenability of these steels decreases as the chromium increases with a given carbon content.

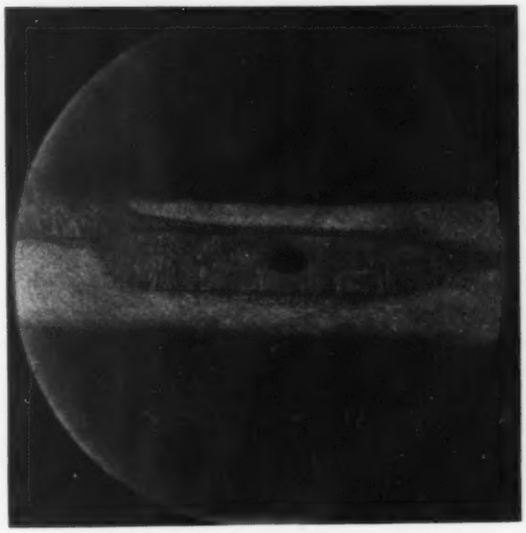

FIG. 2—This is an example of a resistance weld where insufficient pressure has caused internal blowholes.

This intermediate range is classified as partly martensitic and partly ferritic, and these steels can be welded with less difficulty than alloys containing either more or less chromium. They are less air hardening than alloys of the lower chromium content, and with the exception of a somewhat lower impact strength, the weld metal has excellent physical properties. In metallic arc welding, if the welds must have corrosion resistance equal to the base metal, the chromium content of the weld should be as high as that of the base metal. If maximum toughness is desired, the chromium content should be held as low as possible. In either case, the variation should not be greater than 1.0 pct. In the 16 to 18 pct Cr steels, there is a drop in impact strength and ductility proportionate to the increase in chromium. These grades are substantially ferritic and non-hardenable.

The third group of analyses are those containing over 18.0 pct Cr, and these are predominantly ferritic when the carbon is in commercial ranges. They are non-hardening, don't respond to a heat treatment, and are subject to

grain growth at welding temperatures. This grain growth is accompanied by reduced ductility and impact strength. However, the physical properties of the weld may be improved by either hot or cold mechanical working of the metal. The impact strength of the weld metal can be improved by severe peening while at red heat.

Resistance welding forges two pieces of metal together with electrically induced heat and mechanically applied pressure. The heat is developed by the resistance of the metal to a high amperage, low voltage current passed through the limited weld area. When the metal reaches the plastic state, mechanical pressure causes the two pieces to unite at the weld area. Resistance welding differs from other welding methods largely in that no extraneous materials such as fluxes, gas envelopes or filler metals are required, with the result that the metallography of the weld areas are not complicated by the inclusion of these materials.

There are two classifications of resistance welding, the first including spot, projection, seam, cross-wire and contact welding, and the second including butt-flash, push-flash, percussive and contact welding. The first group is truly resistance welding since the heat of welding is developed by resistance alone. The second is welded by heat generated from other sources. Heat generation in percussive welding is dependent upon an intense spark gap, and in flash-butt welding the major portion of the heat is generated by the flashing arc and the combustion of the metal within the arc. For simplification, resistance welding procedures only as applied to the first group will be discussed.

In resistance welding, to produce a proper weld, three factors must be accurately controlled. These are the amount of current passing through the work, the time that the current is allowed to flow, and the electrode pressure on the work. Welding speed is directly proportional to the rate heat is generated, which in turn depends upon the physical properties of the metals to be welded. Other factors such as heat losses from radiation and conduction must be considered. Thus, the mathematical formula expressing heat generation in a resistance welding procedure is expressed as:

$$H = I^2RT(K)$$

Where: I is the current in amp
R is the resistance of the work in ohms
T is time of current flow in sec
K represents radiation and conduction losses in material and electrodes

In resistance welding austenitic stainless, welding currents are lower than those employed for carbon steels because of the higher electrical resistivity of these alloy steels. Also, pressures maintained during welding are consistently higher. High pressures are required because of the higher tensile strengths of these steels. This is particularly true in seam welding where tight welds are required. It has been found that material preformed from pickled stock, recognized as No. 1 finish, is widely accepted, especially in machines where pressure application is limited. Where extremely high pressures can be realized in a welding mechanism, the mill polished sheets are often employed to minimize subsequent polishing. The higher tensile strengths of these steels can be overcome by the proper application of pressure. Thus, the type of sheet stock employed depends upon the construction of the welding machine employed and the pressure that can be applied. The welding cycle must be short to minimize carbide precipitation in the unstabilized grades of austenitic stainless steels.

Successful spot welding of austenitic alloys necessitates observance of several details.[3] The

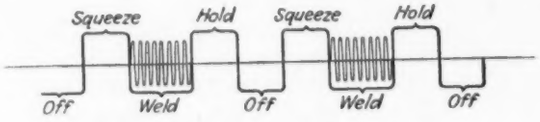

FIG. 3—Spot welding consists of four movements within a cycle, as illustrated here.

magnitude of the welding current must remain the same at each weld and random transients cannot be tolerated. It is preferable that the welding current remain uniform and as nearly sinusoidal as possible. For this reason, the welding current should be applied always at the same point of voltage wave, preferably one that does not result in any transient current. The use of auto-transformers between the welding transformer and the welding contactor should be avoided.

The duration of the welding current should be consistent. Welding at time intervals of less than five cycles (1/12 sec) should not be attempted unless timing accuracy of better than ¼ cycle (1/240 sec) can be assured. Where it is desirable to use very short time intervals, as in welding thin gages, timing equipment of the full electronic type, independent of mechanical switching of current, should be used. A timing variation of more than one cycle in the duration of a weld should not be tolerated in any case.

Welding pressure should be uniform. Variation in pressure will effect both the current density of the weld by changing the contact area and the electrical resistance of the weld.

Adequate jigs must be provided to hold the surfaces to be welded in good contact with each other and relieve the welding arms of the need of flattening out ripples and buckles.

The surfaces to be welded must be clean and completely free of all scale, oxide, dirt, grease, or drawing compound.

Considerably higher pressures should be used than is customary with mild steel. Good results can be obtained with pressures two or three times those used for mild steel.

For best results, electrode tips should be made of a special copper alloy not less than RB 70 in hardness nor have less than 85 pct electrical conductivity. They should be designed to operate at low temperatures, either by water cooling or some other method.

The lack of sufficient pressure is manifested in the development of blowholes inside the weld metal, and, in extreme cases, in actual surface fusion of the metal. Proper pressures should be maintained at all times to insure the absence of these defects. Such defects are shown in fig. 2.

Because of the comparatively high contact resistance of the high tensile austenitic steels, the short circuiting of the preceding weld on each new weld may be considerable, particularly if more than three metal thicknesses are

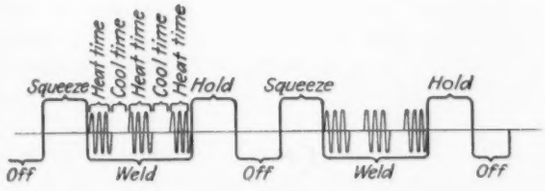

FIG. 4—Pulsation welding is a form of spot welding where welding is interrupted without releasing pressure on work, as illustrated here. The method is used for welding heavier gages.

welded together and if the spacing of spots is comparatively close. This effect should be measured and compensated for by a suitable increase of the welding current.

Spot welding consists of four distinct movements within a cycle. These movements, shown in fig. 3, consist of a squeeze time or period between pressure application and welding, the weld time or time necessary to weld, the hold time or time where pressure is maintained after the weld is made, and the off time or the period when the electrodes separate to permit moving the material for the next weld. Flat faced electrodes are used in spot welding stainless steels, the diameter varying with the thickness of the material welded. The electrode diameter is important since this controls the weld nugget size. If the diameter is too small, the spot weld is weak even though it is sound. If the diameter is too large, the area underneath the tip may become too hot, resulting in a poor appearance and a weak weld because of voids and blowholes caused by insufficient unit pressure. This variation of electrode diameter along with other pertinent data such as net electrode force, weld time for a single impulse, and welding current, are based on recommendations of the American Welding Society.[3]

Pulsation welding, a form of spot welding where the welding is interrupted one or more times without either moving the work or releasing the pressure, is shown in fig. 4. This technique is used largely in welding gages of about ¼ in. The advantages of pulsation welding for heavy gages are several. Water cooling in the off-time cycles permits better electrode life. Thicknesses can be welded that would be difficult to weld by other means. Equipment capacity is usually increased by this type of welding. Weld consistency improves in some cases. The use of lower current values minimizes spitting or splashing of the weld metal and less power is required. Scaly steels and oxide coatings can be penetrated, even though this is considered bad practices in welding stainless steels. Brittle compositions such as straight chromium analyses can be alternately welded and annealed by pulsation welding.

The flat type electrode is employed, as in single impulse spot welding, and the net electrode force and number of impulses depends upon the thickness of the material to be welded. Values to be used in pulsation welding are those recommended by the American Welding Society.[3]

Projection welding is a form of spot welding where the current flow and heating during welding are localized at a predetermined point or line by the design of the parts to be welded. This is done by making projections or embossments on one or both of the metal parts to be welded. Various types of projections are shown in fig. 5. The dome type is preferred for welding materials less than 0.031 in. thick to prevent the collapse of the projection under electrode pressure. The button type projection is preferred for welding flat stampings over 0.031 in. thick. The elongated projection is best suited for curved sections, insuring proper contact since it is desirable to start with a point of contact from which the weld may grow. The cross-wire projection weld is for manufacturing wire products. The shoulder projection is for plug welding. The ring projection method is used in substituting welding components for screw machine products.

In projection welding, on each thickness of stock there is an optimum height and diameter of projection. If the projection height is in-

creased over that optimum, the metal at the edge of the projection is weakened and an inferior joint results. If the projection diameter is increased over the specified amount, the current is proportionately increased and causes difficulty in obtaining a uniform current distribution in the weld area. This ultimately affects weld strength. Recommended dimensions of projections are in accordance to the standard practices of the American Welding Society.[3]

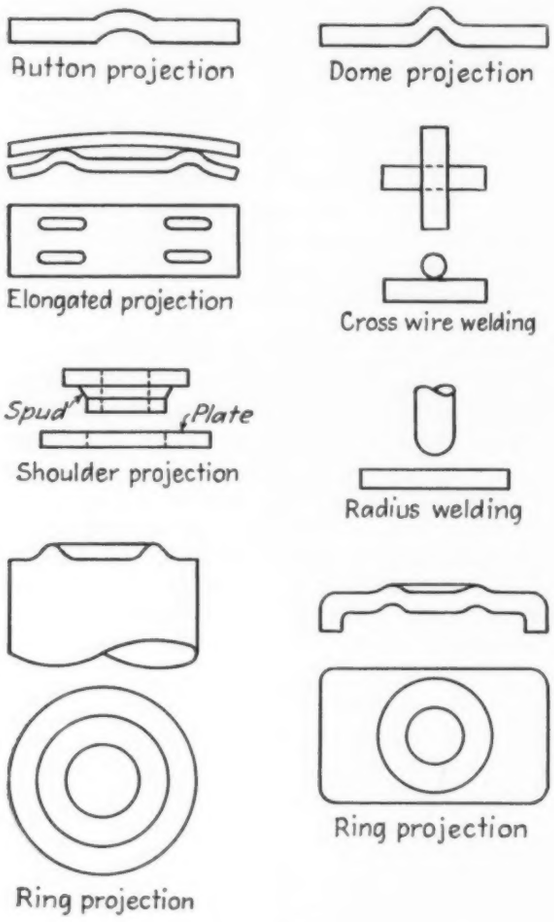

FIG. 5—Various types of projections used in projection welding are illustrated.

Projection welding is usually in multiple spots and all projections that are welded simultaneously require that the height must be uniform and in the same plane. Disregarding this fact frequently is the source of common difficulties. There are so many variables in projection welding that it is practically impossible to even estimate the time, current and pressure required. Material to be welded, stock thickness, size and number of projections, and throat area are a few factors that must be considered. Also, the load and stress concentrations of a specific design must be considered so that the number and spacing of projections can safely resist these loads.

Spacing is important since there may be shunting current losses if the projections are too close. This may cause a definite reduction in welding die life. Projection welding electrodes differ from spot welding electrodes in that the die, in most applications, is form fitted to the projection design. This design varies in relationship to the design of the projection, but in all cases there is a greater portion of electrode in contact with the work.

Pressure and follow-up are important in projection welding. Frictionless head movements are necessary because of the relatively small contact area at the start of the current flow, or, inversely, the high current densities realized before the metals become fused. In welding light to heavy material, both the projection height and diameter should be in accordance to the light stock requirements. On the other hand, if heavy gage stock is welded to light stock, the projection diameter is in accordance to the heavy material and the projection height is in accordance to the light gage specification.

The second and final part of this article will conclude the discussion of resistance welding with a section on spot, seam, and roller welding, and will describe various methods of arc and gas welding stainless. Part II will appear in the next issue.—Ed.

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PAINTS FOR ENCLOSED STRUCTURAL MEMBERS IN STEEL HOUSING CONSTRUCTION

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Summary: Corrosion difficulties, arising from condensation between the walls of steel housing units, require that structural members be protectively coated. An investigation of 34 kinds of paint systems, under environmental conditions simulating those expected to be encountered in service, is described. Evaluation of protectiveness of paint films is based on continuous immersion in water, contact with air at high humidity, continuous condensation, alternate wet-dry conditions and continuous contact with insulation in the presence of water.

IN recent years, isolated instances of corrosion difficulties resulting from condensation of moisture between the interior and exterior walls of dwelling houses constructed from steel have attracted considerable attention and interest. When condensation occurs to a sufficient degree, damage to the strength properties of the structure may result. No definite statistics are available to indicate how widespread the problem is, but there is no doubt that structural members must be coated for corrosion protection, and that coating systems vary in their effectiveness.

The present investigation of paint systems for the protection of steel was undertaken as a part of the research program initiated by the Technical Committee on Protective Coatings of the American Iron & Steel Institute. Its primary objective was to evaluate paint coatings by lab-

oratory testing under environmental conditions simulating those which may be encountered during the life of steel housing units.

Conditions which bring about deterioration of paint films and corrosion of coated steel in the service under discussion are somewhat different from those ordinarily encountered. It has been observed that under certain conditions of climate and design, structural members may be subjected to continuous immersion in water. They may be subjected to contact with insulation in the presence of water, to moisture condensation that is continuous over extended periods of time, to periodic wet-dry conditions and to an environment of high humidity at relatively high temperatures. The usually important effect of ultraviolet light on the deterioration of organic coatings is entirely absent in this case, involving only enclosed members.

Further, the criteria used for evaluating deterioration in connection with this type of service are, in some respects, unique. The appearance of the coating is of no importance: Its exclusive function is to protect the steel from corrosion and consequent loss in strength. Discontinuities in the protective film are inevitable because of the damage resulting from handling subsequent to painting. The behavior of both film and steel in areas where the film is damaged must be considered in the evaluation of paint systems.

This article is based on a report presented at the general meeting of the American Iron & Steel Institute, New York, May 1949.—Ed.

Table I contains the pertinent details, with respect to paint composition and coating data, for the paint systems which have been applied to steel panels for study. All systems were cured by air drying, with the exception of L, M, N and O_a, which were baked, and all comprised one coat of essentially 1-mil minimum thickness except for the following: System F_2—one coat, 2-mil thickness; System F_3—two coats, each 1-mil thickness; Systems H_2, H_3 and H_4—5, 10 and 15-mil thicknesses, respectively; System O, O_a and Q—two coats, each ½-mil thickness.

Procedure for Coating Test Panels

Preliminary investigation indicated that the most standard and reproducible method for applying a uniform paint coating (of the thickness desired) to a test panel was by a controlled dipping procedure. Considerable exploratory work was done to determine the necessary adjustments in paint viscosities and withdrawal rates which would result in uniform coating thickness, not only upon individual panels but from panel to panel for each paint system. It was necessary in some cases to decrease the viscosity of the paint by the addition of a suitable solvent, while in others the viscosity was increased to the desired value by evaporation of the volatile material.

TABLE I

Paint Composition and Coating Data

Designation	Type Coating	Type Cure	Coating System	Pigment, Pct	Vehicle, Pct
A	Red lead/phenolic modified alkyd	Air dry	1 coat, 1 mil thick	80	20
B	Iron oxide/raw linseed oil/modified tung, linseed, phenolic	Air dry	1 coat, 1 mil thick	60.2	39.8
C	Red lead/mixed linseed oil	Air dry	1 coat, 1 mil thick	80.7	19.3
D	Zn dust, Zn oxide/linseed oil, alkyd	Air dry	1 coat, 1 mil thick	76.7	23.3
E	Zn dust, Zn oxide, Fe oxide/alkyd resins	Air dry	1 coat, 1 mil thick	74.7	24.3
F_1	Iron oxide, Zn chromate/phenolic varnish	Air dry	1 coat, 1 mil thick	52	48
F_2	Iron oxide, Zn chromate/phenolic varnish	Air dry	1 coat, 2 mils thick	52	48
F_3	Iron oxide, Zn chromate/phenolic varnish	Air dry	2 coats, each 1 mil thick	52	48
G	Lead chromate, red oxide/alkyd resin	Air dry	1 coat, 1 mil thick	50	50
H_1	Asphalt type	Air dry	1 coat, 1 mil thick	.....	.....
H_2	Asphalt type	Air dry	5 mils sprayed	.....	.....
H_3	Asphalt type	Air dry	10 mils sprayed	.....	.....
H_4	Asphalt type	Air dry	15 mils sprayed	.....	.....
I	Zn chromate, iron oxide/alkyd vehicle	Air dry	1 coat, 1 mil thick	38	62
B_a	Iron oxide/raw linseed oil	Air dry	1 coat, 1 mil thick	60.2	39.8
C_a	Red lead/raw linseed oil	Air dry	1 coat, 1 mil thick	80.6	19.4
L	Zn dust, iron oxide, Zn oxide/alkyd	Baked 1 hr at 250°-275°F	1 coat, 1 mil thick	61.0	39.0
M	Iron oxide, Zn chromate, Zn oxide/alkyd	Baked 1 hr at 250°-275°F	1 coat, 1 mil thick	44	56
N	Iron oxide, Zn oxide/alkyd	Baked 1 hr at 250°-275°F	1 coat, 1 mil thick	47	53
O	Zn chromate/vinyl wash primer/red lead/vinyl	Air dry	2 coats, one coat wash primer and one coat of anti-corrosive primer each ½ mil thick	22.5	77.5
O_a	Zn chromate/vinyl wash primer/red lead/vinyl	Air dry then bake 10 min at 325°F	.....	22.5	77.5
Q	Red lead/vinyl-Zn chromate/vinyl Butyral	Air dry	2 coats, each ½ mil thick	22.5	77.5
R	Zn chromate, iron oxide/CWO, phenolic	Air dry	1 coat, 1 mil thick	44.7	55.3
S	Red lead, Zn oxide lead chromate/alkyd	Air dry	1 coat, 1 mil thick	61.7	38.3
T	Zn chromate, iron oxide, Zn oxide/alkyd	Air dry	1 coat, 1 mil thick	56.7	43.3
U	Red lead, Zn chromate, Zn oxide/alkyd	Air dry	1 coat, 1 mil thick	49.2	50.8
V	Zn chromate, iron oxide/alkyd	Air dry	1 coat, 1 mil thick	44.5	55.5
W	Zn chromate, iron oxide/alkyd	Air dry	1 coat, 1 mil thick	47.3	52.7
X	Zn dust, Zn oxide alkyd	Air dry	1 coat, 1 mil thick	61.8	38.2
Z	Zn dust, Zn oxide linseed, phenolic	Air dry	1 coat, 1 mil thick	73.5	26.5
BB	Red lead, iron oxide/phenolic	Air dry	1 coat, 1 mil thick	59.2	40.8
BC	Red lead, iron oxide/phenolic varnish	Air dry	1 coat, 1 mil thick	62.0	38.0
BD	Red lead, Zn oxide, Zn yellow, iron oxide/caster oil alkyd	Air dry	1 coat, 1 mil thick	51.6	48.4
BE	Red lead, silicate/phenolic varnish	Air dry	1 coat, 1 mil thick	65.9	34.1

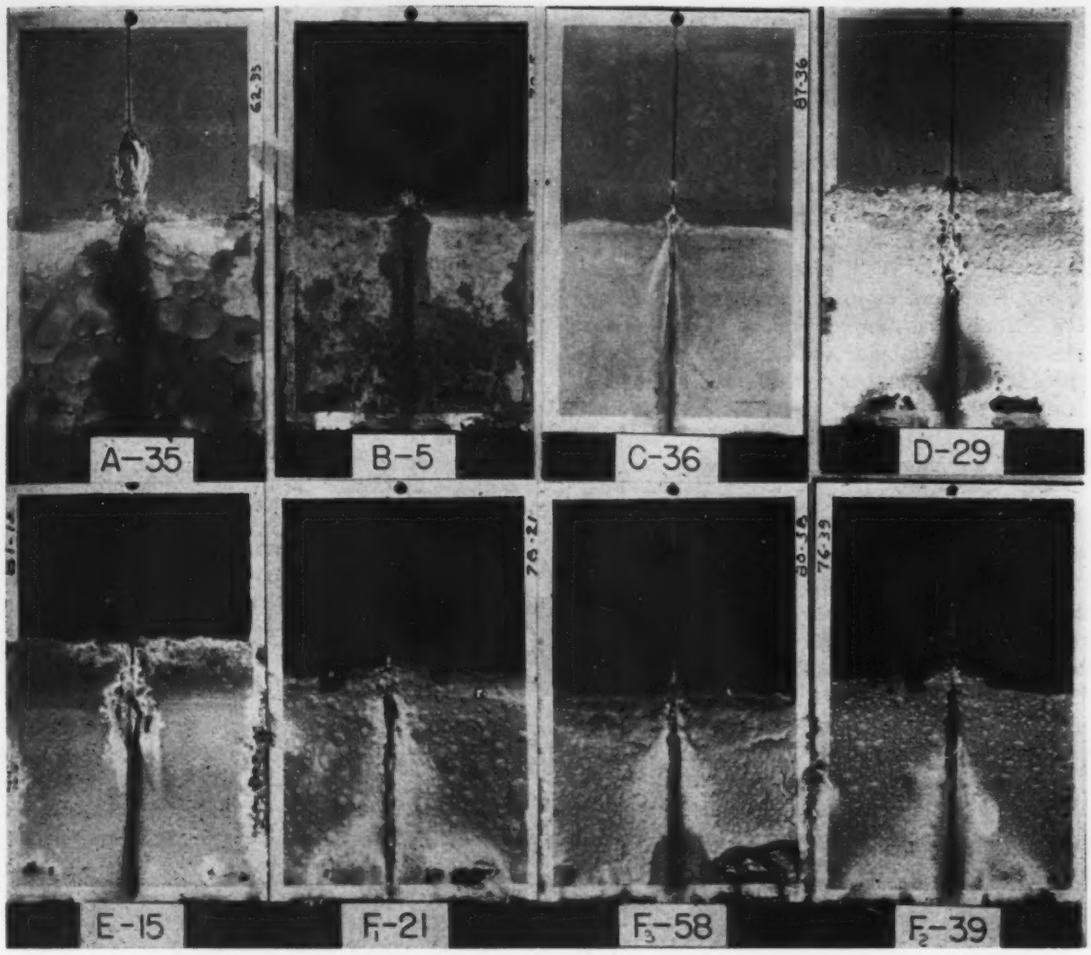


FIG. 1—Condition of coated panels after exposure to continuous partial immersion in distilled water at 100°F for 3000 hr.

After adjustment of the viscosity of the coating material in question, the panels were lowered into the paint and removed by means of a Fisher-Payne dip coater at a withdrawal rate of 1 ipm. The painted panels were then either dried in a constant-temperature and constant-humidity room (78°F and 50 pct relative humidity) for at least 3 weeks before being subject to test or baked, as in the case of L, M, N and O. During actual dipping, the viscosity of each paint was rechecked, after coating five test panels, and readjusted if necessary. Each panel was weighed prior to coating and reweighed after drying, in order to determine the weight of film applied.

This dipping procedure was utilized in preparing panels of all paint systems, with the exception of H_2, H_3 and H_4. In these cases, it was necessary to apply the paint by spraying in order to obtain film thicknesses of 5, 10 and 15 mils.

To insure an adequate supply for test purposes and to provide a sufficient number from which the most uniform, with respect to film thickness, could be selected, 30 to 60 panels were prepared for each system listed in table I.

The actual thickness of the dried paint film (either air dried for 3 weeks or baked) on each panel was measured by means of a General Electric type "A" thickness gage. Measurements of film thickness were made at six different locations on each side of each coated panel. Film-thickness range and average film-thickness data are included with the corrosion test data described later.

Tests were conducted on triplicate panels for each coating system, two panels in the as-painted condition and one intentionally damaged before exposure.

Several criteria were used to rate the coating systems for each test condition: (1) Time until appearance of first blister, (2) blister size and pct of area covered, (3) appearance of base metal after removal of paint film, (4) weight loss of metal and (5) degree of undercutting (under-film attack) of paint film and penetration into base metal at damaged zone. It was convenient to record the most typical blister size by reference to the ASTM photographic standards.[2] For blister size designations used, No. 10 indicates no blistering, No. 8, small blisters (pin point), No. 6, somewhat larger blisters, and so on to No. 0, which indicates very large blisters.

Deterioration of base metal, degree of undercutting and degree of penetration were rated by the designations A, B, C, and D. An explanation

of these ratings is included in table II.

For most of the paint systems, the panel, after testing, was stripped of paint in a 10 pct KOH solution at 100°F and underlying rust (if any) was removed by cathodic treatment in a 10 pct NaCN solution at room temperature.

Since the most severely corrosive conditions were encountered for continuous immersion in water, complete tabular data in this article are limited to the continuous partial immersion tests. Results of the other tests paralleled those in the continuous partial immersion test with but few exceptions as mentioned in following sections.

Continuous Immersion in Distilled Water

In the continuous immersion tests, panels were held vertically in a Lucite block containing suitable grooves. The assembly of panels and Lucite block were placed at the bottom of a 9-liter Pyrex glass battery jar and distilled water was added until the panels were 50 pct immersed. Constant-temperature water baths were used to maintain the battery jars at 100°F. The upper portion of the panel was exposed to moist air at essentially 100 pct relative humidity, while the lower half was in continuous contact with distilled water at 100°F. Evaporation losses were regularly made up with distilled water. Each formulation was tested in a separate vessel, in triplicate. The coating on one panel was damaged and on the other two undamaged. Coating and blister data for 34 paint systems tested under these conditions, including degree, size and extent of blistering after 3000 hr, are recorded in table II.

Photographs of the painted panels (damaged), after 3000 hr exposure for essentially all of the paint systems, are shown in figs. 1, 2, 3 and 4. Systems H_2 (5 mils) and H_3 (10 mils) are not shown, since they had the same appearance as H_1 (15 mils), and O_3 was not tested in the damaged condition.

It can be seen from the figures that the severest damage to the film has taken place at and below the water line and, at least in some cases, adjacent to the scratch line. The upper half of each specimen was in contact with air at practically 100 pct relative humidity, and essentially no blistering was observed on these surfaces. At and below the water line, blisters developed in many of the coating systems which were quite large in size and formed at a rather early stage. Consideration of the data contained in table II and the appearance of the panel (water phase), as shown

[1] *Procedure A, Cleaning*, 1945 *ASTM Book of Standards, Part I*, p. 192.

[2] *ASTM Designation D714-45, B.S. II*, p. 1171, 1946.

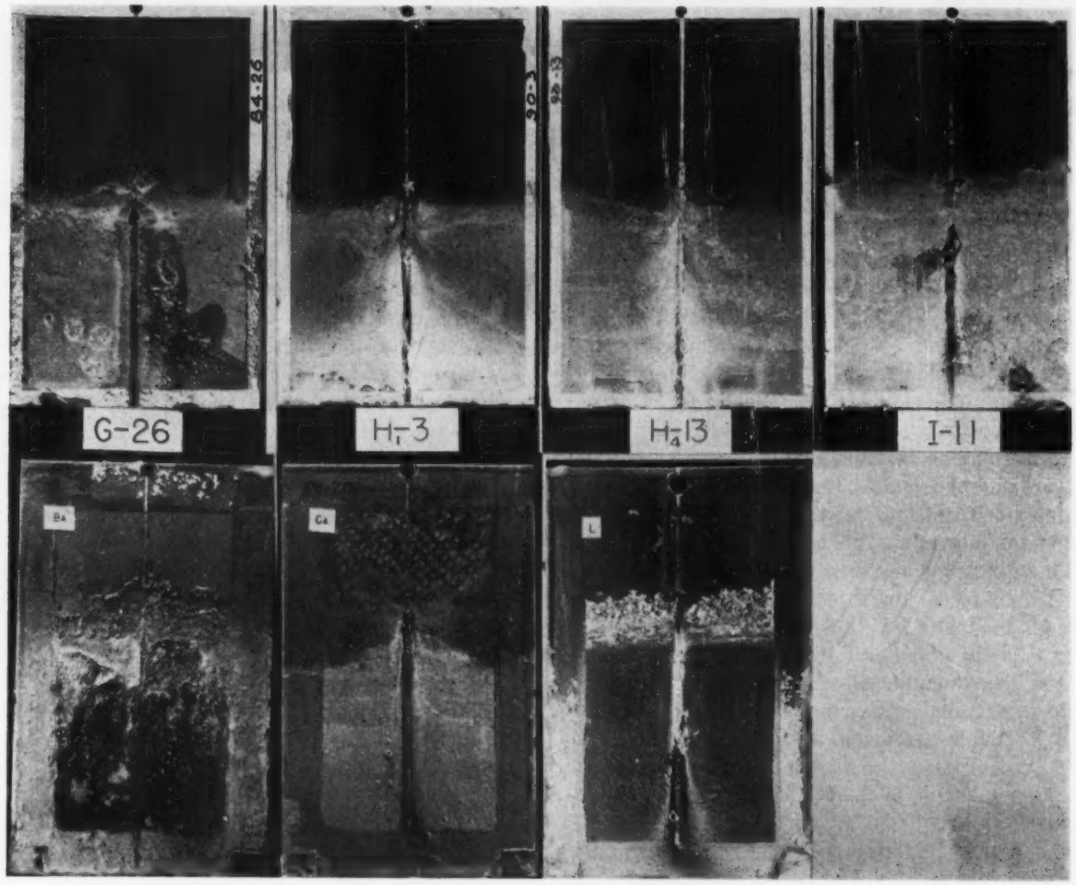


FIG. 2—Condition of coated panels after exposure to continuous partial immersion in distilled water at 100°F for 3000 hr.

TABLE II

Results of Continuous Partial Immersion After 3000 Hr Exposure in Distilled Water at 100°F.

Designation	Film Thickness Range, Mils	Av. Film Thickness, Mils	Rating of Base Metal				Av. Metal Loss, G.	Blister Rating	
			Base Metal Attack		Damaged Zone				
			Water Phase	Air Phase	Degree Undercutting	Degree Penetration		Size	Area Blistered, Pct
C	1.13–1.38	1.25	A	A	A	B	0.07	8–9	1
C_a	1.00–1.30	1.10	A	A	A	C		7	5
BC	1.00–1.02	1.00	A	A	A	C		10	0
BD	1.00–1.10	1.08	A	A	C	C		5	50
BE	1.10–1.25	1.16	A	A	A	C		6	25
A	1.11–1.21	1.18	C+	A	D	D	0.29	0	100
Q	1.20–1.40	1.33	C	A	A	D		4	25
S	1.15–1.45	1.30	B	A	C	C		1	90
U	1.10–1.35	1.18	B	A	D	C		0	100
BB	1.10–1.20	1.14	C+	A	B	D		4	25
I	1.15–1.30	1.24	A	A	B	D	0.02	2	75
O	1.00–1.10	1.03	B	A	A	D		6	5
O_a	1.00–1.40	1.08	A	A				10	0
W	1.08–1.18	1.10	A	A	A	D		3	25
V	1.05–1.20	1.11	B+	A	A	D		4	50
R	1.05–1.40	1.22	A	A	B	D		5	25
T	0.95–1.20	1.08	B	A	D	C		1	90
F_1	1.15–1.31	1.24	D	A	D	D	0.32	1	100
F_2	2.70–2.95	2.80	D	A	B	D	0.32	1	100
F_3	2.65–3.50	2.83	D	A	D	D	0.28	1	100
B	1.15–1.40	1.28	D	A	A	D	0.87	0	100
B_a	0.95–1.50	1.08	D	A	D	C	2.68	0	100
M	0.95–1.40	1.22	B+	A	C	C		3	75
N	1.20–1.30	1.25	B	A	C	D		2	90
L	1.15–1.35	1.25	B	B	C	C		4	75
D	1.17–1.39	1.28	C+	A	B	D	0.19	4–8	100
E	1.21–1.42	1.32	C	A	B+	D+	0.32	6–8	75
X	1.00–1.25	1.12	B	A	A	D		6	50
Z	1.15–1.65	1.39	B	A	A	D		6	50
G	1.28–1.40	1.35	D+	A	D	D	0.28	2–4	100
H_1	1.07–1.19	1.12	A	B	A	D	0.22	9	1
H_2	5.00–6.90	5.73	B	B	A	D	0.07	10	0
H_3	9.00–11.50	10.16	B	B	A	D	0.04	10	0
H_4	14.00–17.00	15.57	B	B	A	D	0.03	10	0

A—negligible B—slight C—moderate D—severe

in the figures, indicate that only systems C and C_a (red lead); H_1, H_2, H_3 and H_4 (asphalt type); O (zinc chromate-red lead); and possibly BC (red lead-iron oxide-phenolic) and O_a (same as O except baked) either did not blister or showed blisters that were relatively few in number and small in size.

Penetration of water through the immersed portion of the paint film by endosmosis gives rise to blisters and to possible attack on the steel base metal. In the case of a damaged panel, the driving force of water is increased by the fact that electric currents tend to flow between the exposed metal (anodic) and the steel areas protected by the moistened paint coating. It is not surprising, therefore, that panels with scratch lines, exposed edges, or other damage usually suffer more severe attack than similar panels completely covered by paint film.

To determine the amount of protection afforded steel by various coatings, the above panels were stripped of their paint film by a suitable solvent, any rust removed by the sodium cyanide cathodic treatment, and examined.

Table II indicates the weight loss of the base metal and a description of its condition after stripping the paint from the panels. Arbitrary rating values were assigned to describe the appearance of the base metal on the undamaged panels in both the water and air phase, and for the condition at the damaged zone (damaged panels) in the water phase, with respect to both degree of undercutting and penetration.

Considering the weight loss of base metal, the data for the system tested indicate that systems C, H_2, H_3, H_4, I and possibly D afforded the greatest amount of protection, while systems B, B_a, E, F_1, F_2 and G afforded the least. The others were of intermediate classification. In general, for these systems the panels (undamaged) having the greatest weight loss showed the severest blistering, and those with little metal loss the least blistering.

Table II also contains the ratings of the paint systems with respect to appearance of base metal (undamaged panels) in both the water and air phase, and the degree of undercutting and penetration at the damaged zone. Consideration of these data suggests certain conclusions:

(1) All systems appear to afford excellent protection to that portion of the panel exposed to the air phase (essentially saturated with moisture at 100°F).

(2) A considerable number of coatings afford excellent protection in the water phase if the coatings are continuous and free from damage. Those which seem to have little merit are systems B, D, B_a, E, F_1, F_2, F_3, G and Q.

(3) In the case of damaged films exposed to the water phase, a decidedly different story is presented. **Only system C** (red lead) offered protection to the bare steel in the damaged zone. In fact, for the majority of the other systems, continued exposure would have resulted in actual perforation of the base metal in this area in a relatively short period of time. This is extremely

important, even though it is realized that the type of damage to which these panels were subjected may not exactly duplicate that which occurs in service. Several compositions resisted undercutting of the paint film at the scratch line, but did not protect the bare steel.

Red Lead Outstanding

(4) Considering all factors in rating the various coatings, system C (red lead) appears to be outstanding. It has a good blister rating, it affords excellent protection to the base metal, as evidenced by low weight loss and slight visual evidence of attack on the steel and penetration and undercutting at the damaged zone are either negligible or slight. The same is true of C_a (same pigment as C but formulated with raw linseed oil), but it appears to have a slightly lower rating in the damaged area, which may not be significant. System O_a, a two-coat system (same as O except baked), shows promise and might be equally as good as, or even better than, C or C_a, although a definite statement cannot be made in the absence of information on damaged panels. System BC, BD, BE and W offer good protection in all cases except at the damaged zone. This is also true of systems H_1, H_2, H_3, H_4 and I, but to a lesser degree.

(5) Applying thicker coatings or increasing the number of coatings of the iron-oxide and asphaltum types has little effect on protectiveness under continuous immersion conditions for either the damaged or undamaged coatings (note the data for systems H_1, H_2, H_3, H_4, F_1, F_2 and F_3).

(6) The baked films, L, M and N, do not exhibit unusual protectiveness in comparison to the air-dry films and, in many cases, they are not as good.

(7) Coating continuity appears to be important when considering coating performance.

Continuous Condensation Tests

In this type of humidity test, continuous condensation is achieved by securing the painted panels to coolers made from copper plate, through which water is circulated to control the sample temperature at 100°F. The coolers are contained in a humidity cabinet which is maintained at 110° and 100 pct relative humidity. The coolers are triangular in cross-section and each panel is exposed at a 75° angle with the horizontal. Under these conditions, moisture condenses on the painted panels with continuous runoff.

Most of the same coating systems which were evaluated under continuous, partial immersion conditions were subjected to continuous condensation tests. Systems C, C_a, H_1, H_2, H_3, H_4, R and Z developed essentially no blistering during the 3000-hr exposure period. Systems D, E, I, L, M, O and Q showed some blistering but not to any great extent. Blisters of considerable size, which covered almost the entire area of the test panel, formed on systems A, B, B_a, E, F_1, F_2, F_3, G, N, S, T and U. The blisters formed on these coatings after a short exposure period.

The panels were stripped, cleaned and examined at the conclusion of the test. For those panels for which weight loss is available, the data indicate that coating systems C, H_4 and I afford excellent protection under the test conditions and are followed very closely by A, D, H_2 and H_3. Systems B, B_a, E, F_1, F_2, G and H are the least protective. With the exception of system G, the duplicate tests on D, E, I and G seem to yield the same test results.

The results indicate that many of the coating systems protect the steel satisfactorily under conditions of continuous condensation. This is true for both the panels containing a continuous film (undamaged) and those intentionally damaged. Systems C, C_a and I seem to be the most outstanding, while B seems to be the least. The others show an intermediate behavior. It should be borne in mind, in evaluating the protectiveness of the coatings to these test conditions, that no severe attack was noted in any case. However, considering all factors, C, C_a and I appear to afford the greatest degree of protection.

Selected paint coatings were tested by cyclic immersion in distilled water. A cycle of 10 min complete immersion, followed by 10 min immersion in air, was used in the tests. Losses due to evaporation from the water were made up daily.

The coating systems were tested for 7300 hr (approximately 304 days or 10 months). It became apparent after 3000 hr exposure that these test conditions were not so severe as continuous condensation or continuous partial immersion and that a long exposure period would be necessary to show differences if they existed. Even after 7300 hr exposure few differences were noted among the majority of the coating systems.

With few exceptions, there was no evidence of blistering on the panels. The exceptions were the intentionally damaged panels of coatings A, B and F_4, and all three panels for coating H_1. Blistering, however, was not exceptionally severe in any case. It was noted that coating B contained a considerable number of cracks.

It was evident from the weight-loss data that little attack occurred on the base metal of the undamaged panels for all systems with the exception of B, F and H_1, even after 7300 hr exposure (10 months). However, considering the degree of film undercutting on the intentionally damaged panels in the damaged zone, systems A, B, E, F_1, F_2, F_3, G, H_1 and I would have to be given a lower rating. Considering all factors, systems

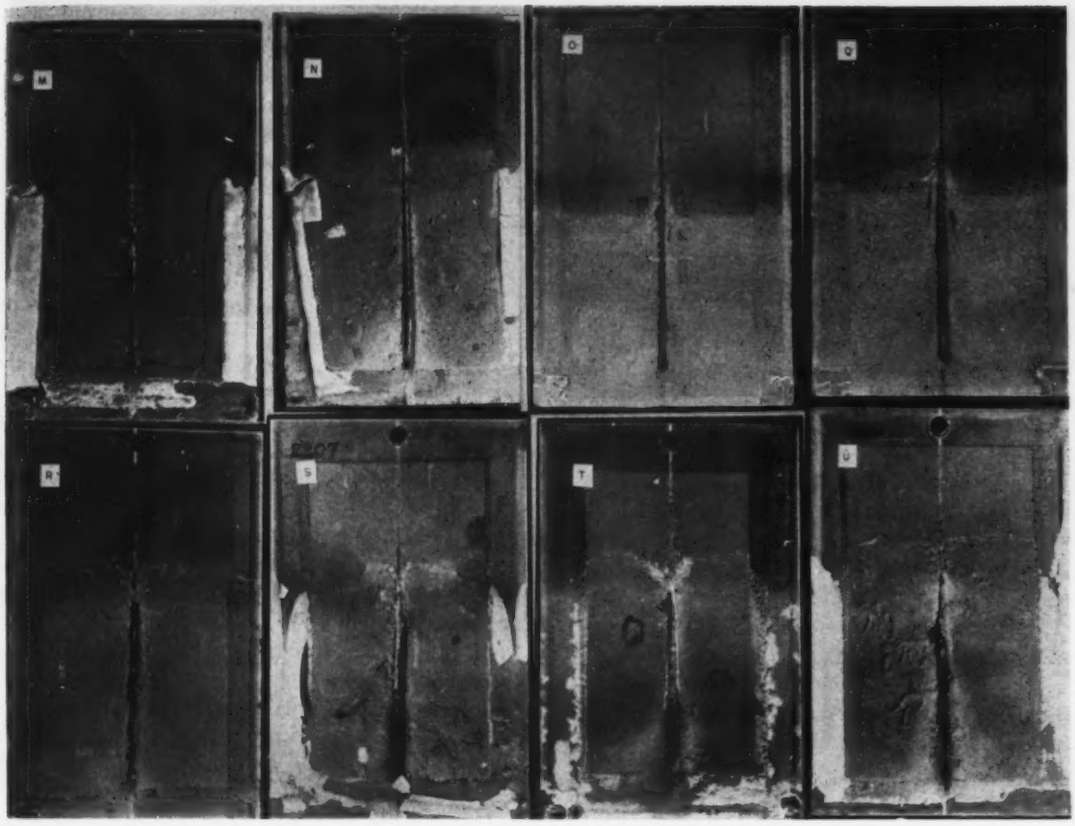


FIG. 3—Condition of coated panels after exposure to continuous partial immersion in distilled water at 100°F for 3000 hr.

C and D seem to afford the greatest protection to the base metal under these test conditions. Coatings H_2, H_3 and H_4 are nearly as effective.

Insulation Tests

As previously described for the partial immersion tests, three coated panels (one damaged, two completely coated) representing the same paint system were held vertically in a Lucite block containing grooves which space the panels approximately 1½ in. apart, the center panel being the damaged one. This same arrangement was used in the insulation tests. Prior to placing the above assembly in the battery jar, insulation was inserted into the 1½-in. spaces between the damaged panel and the two which were undamaged so that approximately two-thirds of the depth of the panels were covered. The assembly of panels, Lucite block, and insulation was then placed at the bottom of the Pyrex glass battery jar and distilled water added until the panels were 50 pct immersed. The battery jars were maintained at a temperature of 100°F. Under these test conditions, the lower half of the panel (below water line) was in continuous contact with insulation and water, while part of the upper half (above water line) was in contact with moist insulation and part simply exposed to moist air at essentially 100 pct relative humidity.

Two types of insulating material were studied, one representing a neutral type (Owens-Corning Fiberglas) and one representing an alkaline type (Johns-Manville Banroc).

Examination of the data for 1500 hr exposure indicated that the asphaltum-type coatings (H_1 and H_2) or those whose pigment is essentially red lead or zinc chromate, alone or in combination (C, C_2, O, O_2 and BC), exhibit excellent resistance to blistering when in contact with either type insulation. This would tend to indicate that they would afford the best protection to the steel. The other coating systems blistered to some extent during the exposure period. Only the air-dry zinc dust-zinc oxide-alkyd system (X) showed rust spots.

Consideration of the results of the above-described tests indicates that continuous immersion in water is the most severely corrosive condition studied. Many of the coating systems deteriorated rather rapidly when subjected to this exposure, resulting in attack on the base steel. The systems which seemed to afford maximum protection when the steel is completely coated were those in which the pigment was either essentially 100 pct red lead (A, C, C_2), or predominately so (BC, BD, BE), or contained zinc chromate (I, R, W and O_2). The asphaltum-type paints (H_1, H_2, H_3, H_4) and those whose pigment contained zinc dust, zinc oxide, or zinc chromate in some combination, were next in order of merit.

However, with few exceptions, the protectiveness of the above systems would have to be given a lower rating when the steel as not completely coated. The red lead-raw linseed oil vehicle (C_a) and the red lead, part raw and part bodied (polymerized) linseed oil vehicle (C) systems were the outstanding exceptions, since they afforded definite protection of the base at the damaged area. The baked (O_a) zinc chromate-red lead-vinyl system shows definite promise, but additional information is needed before it can be fully evaluated. The air-dry systems, red lead-iron oxide-phenolic (BC), red lead-zinc oxide-zinc yellow-alkyd (BD), red lead-silicate-phenolic (BE), and zinc chromate-iron oxide-alkyd (I and W) rated high but had a lower overall rating than the red lead-linseed oil systems (C and C_a when considering protection at the damaged zone. Coatings in which the pigment was predominantly iron oxide (B, B_a, F_1, F_2, F_3) were the poorest in regard to corrosion protection.

In continuous contact with either a neutral or alkaline-type insulation and in the presence of water, paint systems in which the pigments were predominantly red lead and/or zinc chromate, showed superior resistance to blistering.

Continuous condensation represents a moderately corrosive condition and, accordingly, many of the paint systems satisfactorily protect the steel either when completely coated or when coating is damaged. As in the case of the continuous immersion tests, systems containing red lead or zinc chromate appear to be most outstanding, while those containing predominantly iron oxide are least outstanding.

An environment of high humidity at relatively high temperature or periodic wet-dry exposure is the least severe condition studied with respect to deterioration of paint films. With the possible exception of the predominantly iron-oxide systems, practically no blistering was observed on any of the coatings, nor was severe attack on the base metal noted even after extended exposure. This was particularly true when the coating was continuous.

The authors acknowledge the help and suggestions of the Technical Committee on Protective Coatings and E. E. McSweeney, E. R. Mueller, K. E. Jackson, F. W. Fink, B. E. Friedl, and others of the staff of Battelle Memorial Institute.

The effect of type and vehicle composition on corrosion protection under the various exposure conditions is not too evident. However, the red lead system (C_a), which was formulated with a linseed oil vehicle, offers more protection, in most cases, than the one formulated with a phenolic-modified alkyd (A).

FIG. 4—Condition of coated panels after exposure to continuous partial immersion in distilled water at 100°F for 3000 hr.

FIG. 1—View of the cut through the skeg on the SS *Hawaiian Merchant*, which was repaired by thermit welding.

SHIP REPAIRS BY THERMIT WELDING

By R. A. FORSTER
General Superintendent,
San Francisco Yard,
Bethlehem Steel Co., Shipbuilding Div.

SUMMARY: Defective stern frames of two Matson Line freighters were repaired in quick order by thermit welding. The jobs were the largest thermit weld repair projects ever done on the Pacific Coast, requiring a total of about 3000 lb of thermit. This article describes the preparation and actual welding techniques employed.

TWO of the largest thermit weld stern frame repair jobs ever performed on the Pacific Coast were recently successfully completed on two Matson C-3 freighters, the *SS Hawaiian Planter* and *SS Hawaiian Merchant*, at the San Francisco yard of Bethlehem Steel Co., Shipbuilding Div. Both jobs were performed under the direct supervision of Metal and Thermit Corp., welding engineers, and both repairs were similar in nature. The thermit weld on the *Hawaiian Merchant* required 1500 lb of thermit. Two welds were made on the *Planter*, one requiring 975 lb of thermit, the other 500 lb.

When the vessels were placed on drydock at the yard for routine repairs, a 4 to 5 in. crack, thought to be a surface crack, was discovered in the forward end of the skeg on both ships, each at a point where the radius of the aperture commences. To determine the extent of these cracks, they were opened by burning and sluffing with an oxygen acetylene torch.

When the full extent of the defect in the ship skeg was determined, it was the recommendation of the American Bureau of Shipping that the only satisfactory method of repairing the *Merchant* was to make a 2-in. cut completely through the skeg at the center of the cavity, shown in fig. 1, then to make one thermit weld that would fill both the cavity and the 2-in. cut.

On the *Planter* the area of the cavity was too great for a thermit weld. It was recommended by the American Bureau of Shipping that a 4½ ft section of the skeg be removed and a new section installed, thus requiring two thermit welds.

Since, in the case of the *Planter*, there was insufficient time to make a pattern and cast a new section, it was decided to take a 24 x 24 in. steel bloom, and heat and forge it to a section 24 x 32 x 72 in. This was shaped by oxyacetylene torches, and by chipping and grinding. Preparation of the section took 46 hr.

The job of keeping the rudder post in align-

ment was one that required the utmost care. The first step before making the complete cut through the skeg was to erect a 100-ton hydraulic jack between the stern frame and the rudder post, with targets erected from the floor of the drydock. Pin gages checked alignment before burning and after the thermit weld was made.

The new section was then installed on the *Planter*, lined up and the smaller of the two thermit welds made. Since the forward butt was the larger of the two, it was completed last.

The procedure carried out on the *Planter* was performed on the *Merchant*. The rudder post was jacked open about 5/16 in. by a 100-ton jack under the hub of the propeller. This space allowed for shrinkage of the weld metal. Then a positive strongback was welded in place.

The next step was to clean rust and scale from the area to be welded. This was followed by an application of pattern wax that was trimmed and shaped to conform to the size of the finished weld, as shown in fig. 2.

While the wax application was being made, a mold box was constructed to hold 18 in. of molding sand, completely surrounding the cast. The mold box was built up as sand was rammed and tamped around the gates and risers. These were set at intervals for preheating, pouring and for the vents.

After the mold was rammed, preheating was started, an operation that required upwards of 30 hr. This melted out the wax, leaving a cored-out section in the molding sand and exposing the ends of the skeg to be welded. These ends were preheated approximately 14 hr with preheaters operating on compressed air and kerosene. All during this operation the skeg was checked for temperature at various intervals until the desired heat for pouring the thermit was reached.

The thermit metal itself was charged into two crucibles that were plugged at the bottom with a tapping pin and refractory material. These crucibles were suspended over the pouring gates

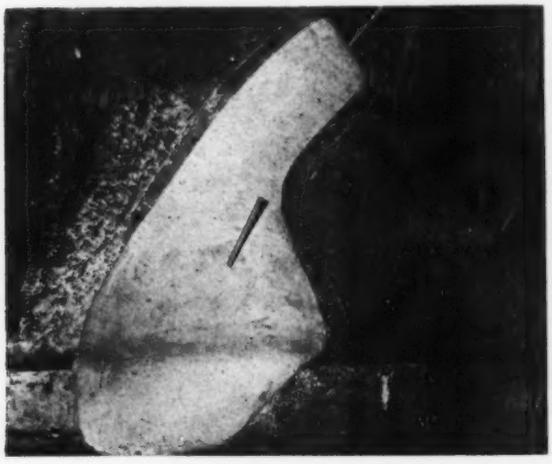


FIG. 2—Finished wax molds on the *Merchant* from the port side.

FIG. 3—After the weld had been made but before gates and risers were removed, the skeg had this appearance.

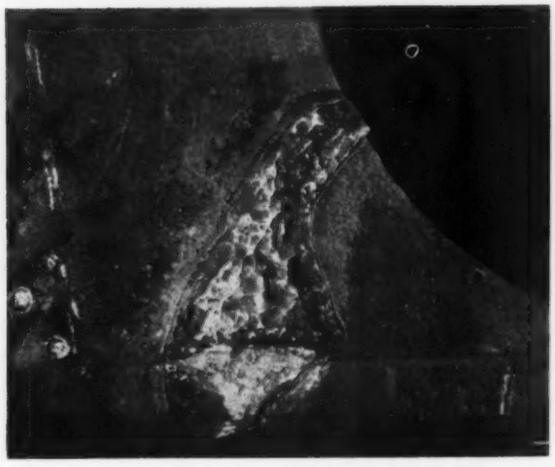


FIG. 4—The finished weld, from the port side. This repair took only 72 hr.

FIG. 5—The repair on the SS *Hawaiian Planter* required the installation of a steel billet and two welds, as shown here.

on the top of the mold box and the thermit was reacted by setting off the refractory material with a charging powder. This was lit with a red hot poker in both crucibles simultaneously.

The reaction lasted about 30 sec, generating a metal temperature of about 5000°F. When the reaction was complete, both crucibles were tapped simultaneously by driving in the tapping pins with long rods, thus freeing the metal to pour into the mold.

After the pouring, the mold box was left intact for about 14 hr for proper cooling, then stripped off, as shown in fig. 3. When the weld was inspected, the risers and gates were burned off, the weld chipped, ground and finished, as shown in fig. 4.

On completion of this work the rudder was swung for inspection by the American Bureau of Shipping and the U. S. Coast Guard and checked with pin gages for alignment from the targets erected for this purpose.

The *SS Hawaiian Merchant* entered drydock one morning, work was authorized to proceed with the thermit weld the following morning, and all the work was completed and tested and the ship was floated three days later. In other words, in just 72 hr the thermit weld was successfully completed and considered by the American Bureau of Shipping as a permanent repair.

The *SS Hawaiian Planter* was drydocked one morning and recommendations for repairs were made the following day. The new section of the skeg was made the following day. The new section of the skeg was made, installed, the two thermit welds completed, as shown in fig. 5, and the ship was ready to sail 166 hr after the work was authorized. This job was also considered a permanent repair.

Press Evens Ends of Bundled Bars

By HERBERT CHASE

WHEN bars of steel are shipped in bundles from steel mills, vibration in transit and handling often causes the bars to shift and to protrude in irregular fashion from the ends of the bundle. This increases overall length and makes the bundles unhandy to shift and to store when they arrive at processing plants. It is also impossible to spark test all bars in the bundle conveniently in checking analysis.

Buick Motor Div., General Motors Corp., which receives and unloads thousands of bundles of steel annually has been bothered by this rod shifting. In its service parts plant at Flint, where bars are unloaded by crane at a siding, the crane operators often sought to even the bars by manipulating the crane to strike one end of the bundle against a wall.

This proved to be a slow and impractical process. The bundle evening press shown in fig. 1 and 2 was built and installed at the siding. The bundle is lowered into a cradle on skids and one end is adjusted against a fixture plate anchored vertically to the concrete floor. At the other end is another plate supported on the piston rods of three air cylinders in a frame fastened to the floor. When an air valve is opened, the cylinder plate is advanced and pushes protruding bars back against the fixed plate so that both ends of the bundle are evened. Then the plungers are reversed to withdraw the movable plate.

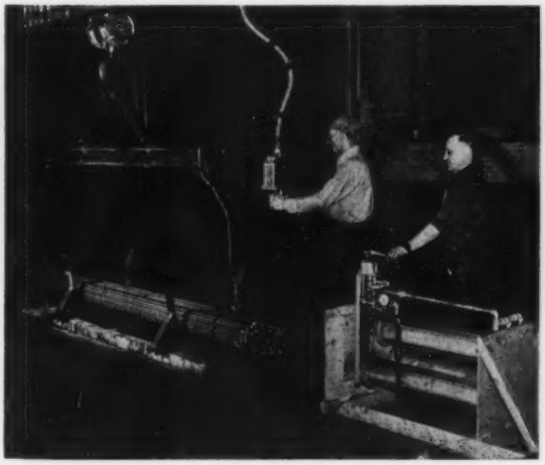


FIG. 1—Before—Bundle of bars placed in cradle by crane at loading platform. Air operated ram, at right, will push bars against plate at left.

FIG. 2—After—Ends of bars have been evened and bundle is about to be lifted from cradle. Ram has been advanced and withdrawn.

ROTARY DRILL JIG
Reduces Machine Downtime

WHEN designing large jigs, handling the jig itself becomes a problem, especially if the unit must be moved to several machining positions. The time required to move the jig to the various positions is unproductive and reduces machining efficiency. Also, moving and placing it on machine tables, unless care is exercised, may result in injury either to the jig or the machine table. By careful study and proper design, many of these problems can be greatly reduced or even eliminated.

In producing a cast low-pressure discharge manifold, as shown in fig. 1, a component used in a Gardner-Denvery Co., Quincy, Ill., two-stage air compressor, problems of moving the jig and rotating it for drilling were overcome by the use of a rotary drill jig of novel design. The jig, shown in fig. 2, supports the manifold in a cast body by cam-operated clamps for drilling six ¾-in. holes in each flange.

This clamping assembly is made up of several steel plates welded together and machined to fit. The assembly is guided by a number of tool steel pins and a set of tension springs.

The manifold casting, after being machined on the faces of the flanges, is placed in the jig body and two clamping assemblies locate the casting in the V guides. Detail 1 of fig. 2 is the V guide, detail 2 is the spring actuating the guides and details 3 and 4 show two positions of the pin that guides the clamp. By actuating the cam lever, detail 5, the casting is located in the jig. The clamping screws, detail 6, lock the casting firmly against the machined surfaces of the jig body for drilling. The cams, detail 7, that actuate the clamping assemblies are operated simultaneously through an arrangement of shafts, arms and levers, details 8, 9, 10 and 11. The cams are case hardened steel. The shafts, details 8 and 9, are maintained in position by steel collars, detail 12, and these in turn are fastened to the shafts by taper pins, detail 13.

Integral with the jig body are two trunnions for mounting the entire jig on a castered trunnion stand. The trunnions are machined to fit bearings in the trunnion stand, allowing the jig containing the manifold casting to be rotated for drilling.

Hardened steel bushings, detail 14, are fitted in both the stand and the jig body for indexing the work, and hardened steel indexing pins keep the work in proper relation to the drill.

The drilling of the six ¾-in. holes in the face of each flange is accomplished through six hardened tool steel flush drill bushings, detail 15. After drilling, the holes are back counterbored through the same bushings.

By simply indexing the jig, the second flange of the manifold casting may be drilled and counterbored. After drilling, the entire jig is removed from the drill press area on the castered trunnion stand.

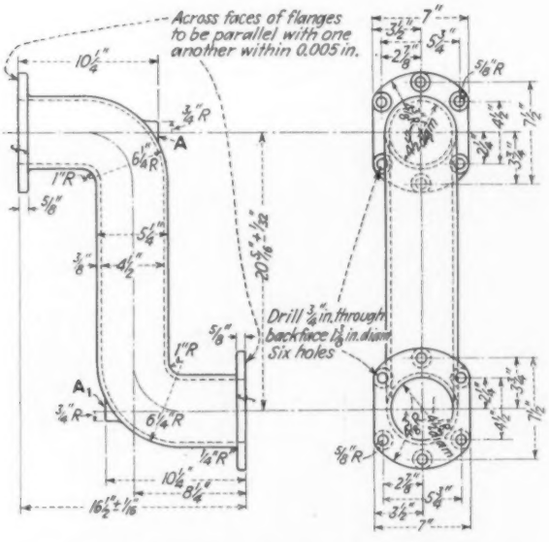


FIG. 1—Six ¾-in. holes are drilled in each flange of this low pressure discharge manifold used in two-stage Gardner-Denver Co. air compressor. Each drill jig mounted on trunnions and carriage permits easy rotation and moving between machines.

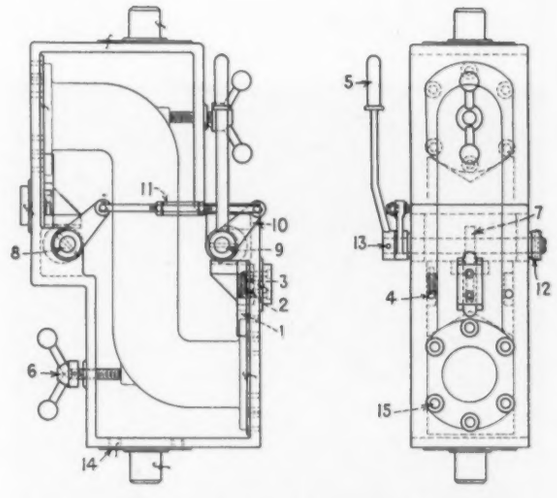
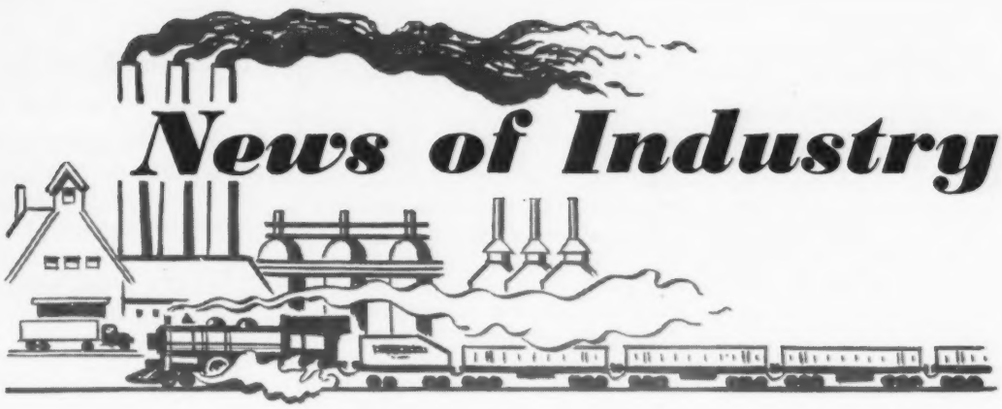


FIG. 2—This rotary drill jig is used for the drilling operations on the manifold. The manifold casting is placed in the jig after flange faces are machined, and it is held in place by cam operated clamps.



Business Bows to Strike

Pittsburgh — Business in the Pittsburgh district plummeted to an 11-year low in the week ended Oct. 1 as a result of the steel and coal strikes, according to the Bureau of Business Research, University of Pittsburgh.

The bureau's index of business activity dropped from 119.1 to 64.8 of the 1935-39 average, lowest point since June, 1938.

Foundry Pay Rates Rise

Washington — Pay of foundry workers has increased from 5 to 15 pct since November 1947, the Bureau of Labor Statistics reports. Rates now range from 93¢ to $1.37 an hr for wood pattern molders and up to $1.53 to $2.35 an hr for machine molders. About 44 pct of the foundries are on a 40 hr basis with the remainder largely on 16 to 38 hr basis.

Plans Warehousing Course

Washington—The Army, Navy, and Air Force are now accepting applications from industry representatives for enrollment in fall training courses in military warehousing practices.

Training courses normally cover a period of from 5 to 10 days and include all phases of depot operations. Information may be obtained by writing the Munitions Board, The Pentagon.

Aluminum Stoppage Adds to Strike Chaos

Walkout at Alcoa seen accelerating economic crisis . . . National outlook grimmer, as steel, coal and aluminum strikes pinch other industries —*By JOHN B. DELANEY*

Pittsburgh—Economic repercussions of the steel and coal strikes grew more grim this week, increasing the pressure for settlement.

But despite mounting unemployment touching practically all segments of the economy, prospects for an early return to work appeared early in the week to be none too bright, barring more forceful governmental action.

An added starter joined the strike parade Monday when 16,000 employees of the Aluminum Co. of America walked out after the company and the CIO United Steelworkers of America failed to reach agreement over the same issue involved in the steel strike—shall pensions and social insurance for workers be on a contributory or non-contributory basis?

Aluminum Production Cut

The Alcoa walkout closed 9 of the company's 25 plants and halved its ingot capacity. However, there is still an ample supply of the basic metal stockpiled and plenty available on the open market from other American and Canadian producers —enough in fact that fabricators who had turned to aluminum as a substitute when their steel supplies were cut off need not be concerned at the moment. Permanente Metals Corp. and Reynolds Metals Co., who together account for 50 pct of American production, are still operating.

Barring agreement with the union, an undetermined number of steel fabricators were scheduled to be struck last weekend as their contracts expired, and many other fabricator agreements terminate early next month. These plants employ some 420,000 workers, thousands of whom will be idled at any rate as steel inventories disappear. Added to the more than 500,000 on strike since Oct. 1, this makes a total of nearly 1 million unemployed or facing unemployment in basic steel and fabricating plants alone.

Despite governmental prodding,

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Personal Income Rate Turns Up

Washington — Indicating a healthy unswing in the national economy, the Office of Business Economics reports the August personal income rate (including partnerships and proprietorships) at $211.5 billion.

This is $1.8 billion increase over July. The overall rate for the first 8 months 1949 stands at $212 billion—$3 billion more than for the same period in 1948.

INDUSTRIAL SHORTS

CANDIDATES WELCOME—A National Lead Fellowship in metallurgy has been established at the Missouri School of Mines & Metallurgy, Rolla, Mo., by the Titanium Alloy Mfg. Div. of NATIONAL LEAD CO., Niagara Falls, N. Y.

AFFILIATE—Creation of a new associated company, AFFILIATED FURNACE & ENGINEERING, INC., specializing in design, construction and maintenance of industrial furnaces, has been announced by Chemsteel Construction Co., Inc., Pittsburgh. Arthur M. Krieger is president and general manager; Clarence B. Avery, vice-president engineering; and Merrill A. Stewart, vice-president construction.

ON THE MARKET — JOSEPH T. RYERSON & SON, INC., Chicago, are again marketing a leaded, free machining steel called Ledloy. It is claimed, through experiments and tests, to be the most machinable steel available in the United States today.

CHANGES TITLE—It has been announced that the corporate name of Kaiser Engineers, Inc., has been changed to KAISER INDUSTRIES, INC. The engineering and construction division will continue to do business as Kaiser Engineers, a division of Kaiser Industries.

GAINS POSSESSION — Property of the Alabama Foundry Co., Birmingham, has been purchased by Walter H. Miller, president of MILLER FOUNDRY CO. Mr. Miller said he had no immediate plans to operate the plant.

NEW OUTLET — JOHN A. ROEBLING'S SONS CO., Trenton, N. J., manufacturers of wire products, has announced that a new office and warehouse has been opened in Cincinnati. W. K. Hanna will serve as manager.

ROD REP — American Manganese Steel Div. of American Brake Shoe Co., New York, has announced the appointment of the WHITEHEAD METAL PRODUCTS CO., INC., as distributors of their various types of rods and electrodes. Whitehead operates warehouses in New York, New Jersey, Pennsylvania, Massachusetts and Maryland.

RECIPIENT — Dr. Frank B. Jewett, for many years vice-president of the American Telephone & Telegraph Co. and former president of the National Academy of Sciences, has been named to receive the 1950 medal of the INDUSTRIAL RESEARCH INSTITUTE, INC.

BUYS—The foundry and machine shop of Shook Bronze Corp., Lima, Ohio, has been purchased by RANDALL GRAPHITE BEARINGS, INC., Chicago. The Randall Chicago plant will be transferred to Lima.

NEW WRINKLE — The equipment of a new pilot plant at Dayton is being completed by NEW WRINKLE, INC., for the production of basic vehicles used in the manufacture of Wrinkle finishes.

UNITE—Recently announced is the organization of the GILLAIR PRODUCTS, INC., Pasadena, Calif., by J. M. Gilmore, president of Standard Machine Works, Pasadena, and Lee J. Laird, former vice-president and general sales manager of Chiksan Co. They will manufacture All-Flex ball-bearing swivel pipe couplings, flexible steel hose, mud guns, etc.

READY TO SERVE — The Indianapolis warehouse of Berger Mfg. Div. of REPUBLIC STEEL CORP. is now open to serve jobbers of sheet metal, building products and equipment products.

Late Strike News

Continued from Page 81

the coal crisis continued at a stalemate. John L. Lewis said he would send his 420,000 miners back to work if the operators will agree to concessions he estimates will cost 30 to 35¢ a ton, but the operators turned thumbs down on that one. Mr. Lewis also asked the government, obliquely, to seize the mines and negotiate a new contract with him. President Truman promptly said he had no intention of taking over the pits.

There was little apparent activity in the steel strike. Cyrus Ching, Director of the Federal Mediation and Conciliation Service, held "exploratory" talks with Bethlehem Steel Corp. last week to get some inkling of what might be done to break that deadlock, and planned similar discussions with other producers and with the United Steelworkers.

Philip Murray, president of the CIO and USW, stumped steel centers in Ohio, Pennsylvania and Indiana last week and this week, and spoke over a nationwide radio hookup to explain the union's position in the strike and to reiterate his determination to hold out for noncontributory pensions.

Some Plants Operate

The union agreed to let Allegheny Ludlum Steel Corp. continue to operate its plants in Pennsylvania and New York State until Nov. 1, after the company had banked its furnace in expectation of a walkout Oct. 15. Allegheny Ludlum's contract originally expired 30 days after agreements of most producers, and the company argued that it was entitled to the same number of days' grace, dating from Oct. 1.

Five divisions of the Blaw-Knox Co., one of the nation's largest fabricators, will continue to operate under an agreement in which the company will set aside 6¢ an hr for pensions while a joint study of a program is under way. The company said the contributory or noncontributory issue is subject to negotiation.

Phil Murray Still Holds the Union Reins

Annual crop of rumors predicting his retirement are in full bloom . . . But there is none to challenge his lead. . . Workers still support him—*By TOM C. CAMPBELL*

New York—The annual crop of rumors that Philip Murray is going to step down as head of the CIO are in full bloom. They always precede the national convention which is being held the last part of this month at Cleveland.

As usual there is no truth in the rumors which this year have been given an added zest because of the steel strike. The gossip runs something like this: Mr. Murray is sick and tired out; he has lost some following; he is losing a fight with the communistic element in the CIO; he will step down as CIO president and let someone else take the helm.

It is also hinted that he can not handle the steel strike and has lost the confidence of the steelworkers. Reports have also gained ground that Mr. Reuther will take over as CIO head. Still other reports insist that Mr. Murray will not be re-elected this year. Other more cautious reports indicate that while he will have the presidency this year he will soon be out of office.

Much Talk Is Gossip

A careful check in the right quarters shows much of this talk, gossip and reports to be so much bilge. Much of it is wishful thinking on the part of other union people who are trying to get Mr. Murray off the hot seat. While the rank and file steelworker appears to be against the idea of striking for a pension he may not get for 20 years, it is not true that he will fail to support the strike. Union members will do as they are told in the case of a strike. The steel strike is no exception.

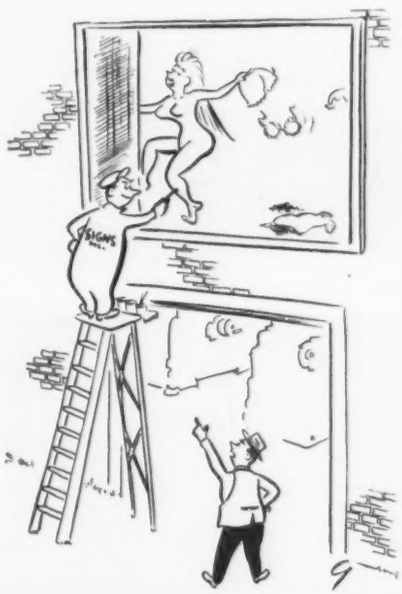
As to Mr. Murray's health. It is not so endangered that it will have any effect on his being re-elected to the presidency of the CIO The rank and file have shown time and again that they want Murray as long as Murray wants the job.

Loss at U. S. Steel's Gary Works In 3 Weeks of Strike

Coke	237,300 net tons
Pig Iron	219,870 net tons
Ingots	329,070 net tons
Steel	273,000 net tons
Coke Oven Gas—	408.5 million cu ft
Blast furnace gas—	26,250 million cu ft
Plus all by products from coke oven gas	
Payroll	$3,301,000
Man Hours	2,040,000

Based on Sept. production and earnings

If there is to be a showdown between Mr. Murray and Walter Reuther, now is not the time when it will come about. It is unlikely that Mr. Reuther will at any time in the near future go after Mr. Murray's job as CIO head. The simple reason for this is that he could not at this stage of the game hope to succeed. And Mr. Reuther hardly ever takes too many things on unless he feels that they are in the bag.



"All right, you've had your joke! Now spell out the words HOT STRIP MILL."

Reuther Has Own Trouble

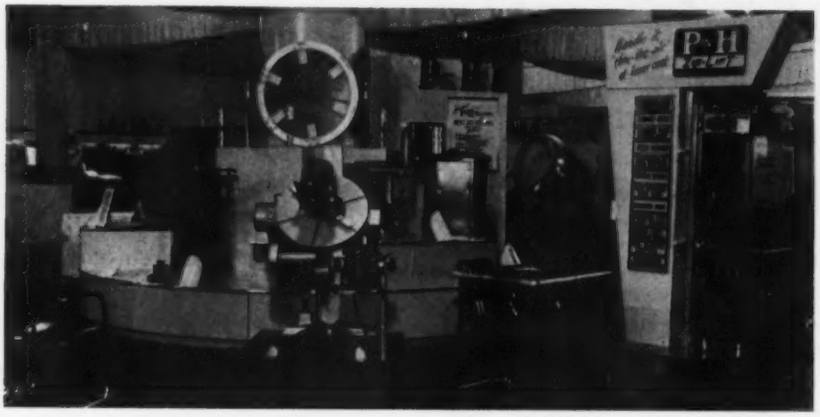
Also, it is believed that Mr. Reuther is going to have a little trouble with his men over the Ford pension settlement. The settlement is being hailed as the "best that Ford has ever made." And some union people are said to agree with that statement. Outside of Mr. Reuther there are no important contenders for the job as president of the CIO.

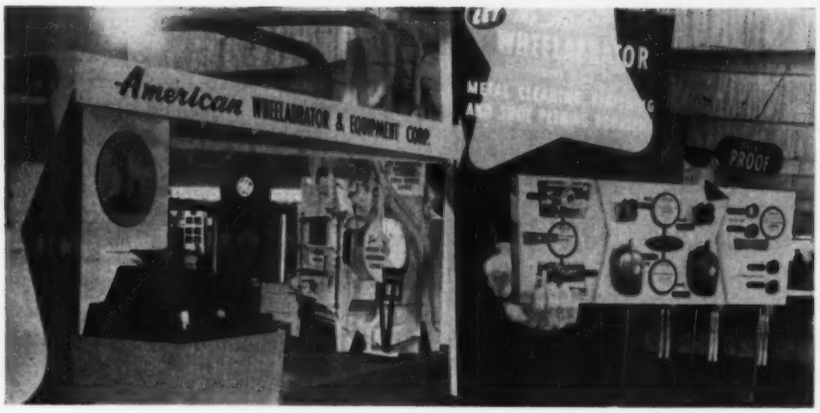
The rallies which Mr. Murray has put on before the steelworkers in an effort to pep them up over the pension fight, while not meant to, will also serve as good tactics for the CIO convention. It will counteract reports that he has lost his steam, that he is unwell and that he is in a corner. This can be true at the same time as it is believed that his taking the field for the pension talks can also be interpreted as a weakness in his fight with the steel companies.

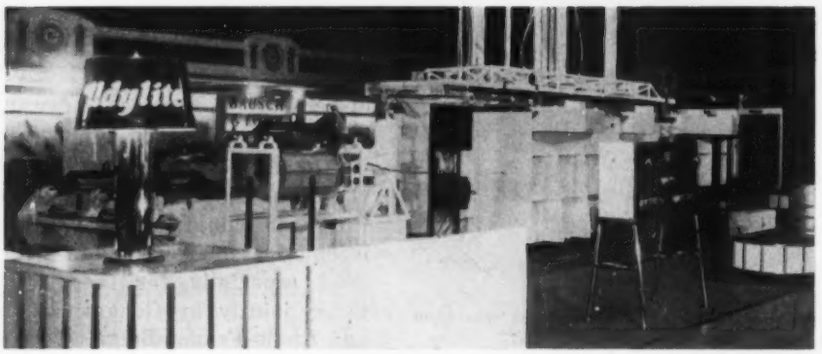
Even though there are hundreds of steel people and other metalworking executives who are sore at him as they have ever been because of his stand on the pension question, that in no way affects their feeling about having him head of the CIO and the steelworkers. It is hardly likely that steel people would get along in normal times with anyone else.

Belgium Will Build Diesels

La Grange, Ill.—General Motors Corp., Electro-Motive Div., has concluded an agreement with the Societe Anglo-Franco-Belge of La Croyere, Belgium, for manufacturing rights for Electro-Motive's diesel electric engines. Under this agreement the Belgian concern will manufacture and have sales rights in the Benelux and other European countries, of a diesel locomotive of new design developed especially for these territories jointly by General Motors and Anglo-Franco-Belge.







Biggest Metal Show

Cleveland—Vanguard of an estimated 40,000 visitors poured into the 31st National Metal Congress and Exposition here at noon, Monday, Oct. 17, when doors to Cleveland's Public Auditorium, which will be headquarters for the metals industry and many of the nation's top production experts this week, were officially opened.

Greeting the visitors was the greatest Metal Show of all time. The huge auditorium has been converted into a highly diversified industrial plant, and appropriate atmosphere for the official theme of the show, "Economy in Production."

More than 350 exhibits covering more than 220,000 sq ft of floor space stress economy in production through products, equipment or services for the production, treatment or fabrication of metals.

Basic Show for Basic Industry

The new machines, the new materials and the new processes developed by the leading companies in American industry are on display. Many companies are occupying more exhibit space than at any previous show, and some feature equipment or processes not heretofore revealed to the public.

Late last week hotels here began to fill up with sales executives, engineers, and installation men and the show began to take shape. Carpenters, millwrights, electricians, crowded the floors of the Auditorium, which as late as Saturday was a litter of wooden crates, tools and tubular furniture, through which industrial trucks weaved in and out, as elaborate exhibits were set up.

More than $8,000,000 worth of the latest industrial equipment has been set up, and much of it is actually operating. Welding, testing, cutting, stamping, grinding, finishing, drilling and turning equipment make this Metal Show a moving panorama of production.

Shows Business Confidence

If the attitude of visitors and exhibitors is any criterion, a lot of business is going to be transacted at this Metal Show. Management's incentive to lower unit costs was never greater

Opens in Cleveland

and this show is a reassuring answer to that need.

Sponsored by the American Society for Metals, American Welding Society, Metals Branch, American Institute of Mining and Metallurgical Engineers and the Society for Non-Destructive Testing, the 1949 Metal Show has many special features, including:

Round Table Talks Planned

Eight round-table discussions on the Metal Show's theme, "Economy in Production";

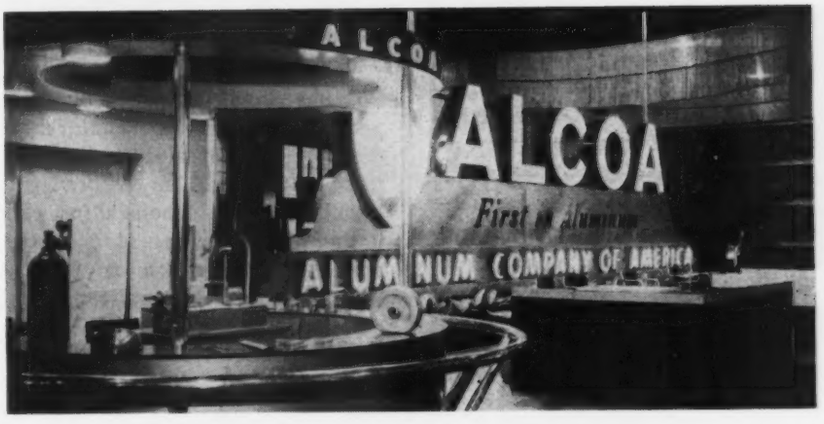
An "Economy Theater" featuring 25 motion pictures by exhibitors depicting production savings through use of their equipment;

Seminar sessions on "Thermodynamics in Physical Metallurgy," educational lecture courses, technical programs and other special meetings by the sponsoring societies.

In addition, there will be the regular technical programs by the four sponsoring societies through their scheduled seminars on technical subjects pertaining to metals production, treating and processing.

The Metal Show's theme, "Economy in Production" will be broken down into specific operational phases, with qualified leaders selected to monitor each of the eight sessions. Well known specialists will participate. Each of these specialists will introduce his solution to a specific production problem, and each of the panel experts will then bring up related problems for possible solution in a round table discussion.

Among the topics to be discussed during the round table session are such items as "Cost Cutting by Use of More Precise Castings or Formed Shapes," "Cost Cutting by Improved Heat Treatment Operations," "Economy in Production in Brazing, Soldering and Welding of Sub-Assemblies," "Economy in Production through Improved Welding Techniques and Equipment" and "Economy in Production through the Use of Improved and More Adaptable Mill Products." These and other vital production operations will receive thorough and able treatment by men who have both theoretical knowledge and practical experience in their respective fields.



War Surplus Disposals Amount to $25.3 Billion

Washington—Disposals of domestic war surpluses returned to the government about 27¢ on the dollar of reported cost. But it cost the government roughly $1 for each $4 recovered.

Surplus officials reported to Congress last week that a total of $27.2 billion worth of property had been turned over to the War Assets Corp. and its predecessor agencies.

Through sale and miscellaneous disposals about $25.3 billion had been unloaded for a total of $4.1 billion, as of July 1, leaving $1.9 billion for future disposals.

In the meantime, Congress has appropriated funds amounting to $1.1 billion for disposal operations (sales receipts were turned over to the Treasury). Some $131 million of appropriated funds were not used.

A total of $7.8 billion worth of war plants and other real property were acquired; disposals amount to $6.4 billion.

Of the total real property disposals, there were 78 cases in which payments were in default as of July 1, involving 33 sales and 45 leases. This is roughly 8 pct of the total held.

Settlement plans have been worked out for 22 cases and officials are working out deals in 35 others. In the remaining 21 cases, however, the matter has been turned over to counsel for the purpose of starting repossession proceedings.

Inaugurates Scholarship Plan

Milwaukee—Allis-Chalmers Mfg. Co. has inaugurated a program providing 20 annual scholarships of $500 each for children of company employees. The children will be eligible for scholarships providing one of the parents has been employed by the company for at least 3 years. Each applicant must also have completed a 4-year high school course or the equivalent.

French Electric Power Industry Receives ECA Funds

Washington—Use of about $33 million in ECA funds has been approved for expansion of French electric power supplies. Two separate projects are involved.

About $16.6 million will be made available to Electricite de France, a government-owned power company. It will buy American-made excavating and similar engineering machinery and equipment, power machinery, and spare parts with the money.

Another $15 million will go into construction of a thermal power plant of 100,000 kw capacity at Dechy. When completed, the plant will be fueled by waste coal and operated by Charbonnage de France, which controls the French coal industry.

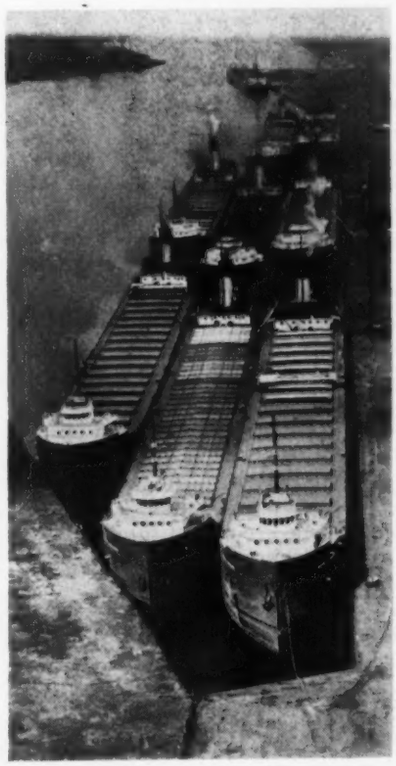
The French government will supply an additional $4.5 million of its own money for the Dechy project. Like the first named project, equipment will be purchased in the United States.

No Home for Ore Boats Caught by Strike

Chicago—Nine U. S. Steel Corp. ore boats tied up in Milwaukee as the result of the steel strike. By the end of last week, nine more carriers checked in, making a total of a little better than 170,000 gross tons of ore which were en route from Duluth to Chicago, being held by the corporation in this port alone.

Other boats made scattered ports all over the Great Lakes area with a total of about 275 vessels having to change their original destination. Ore boats tied up at the Indiana Harbor works dock of Inland Steel Co. were left unloaded with the crews passing through the picket lines of the striking United Steel Workers, CIO.

If possible, boats will be brought into the mills and unloaded when the strike is over. It is expected, however, that some of them will have to lay over in loaded condition all winter and deliver early in the spring. In this case, a lot of much needed repair to these vessels will not be done until after the season starts next year.



Gray Iron Founders Will Hold 21st Annual Meeting

Cleveland—Gray Iron Founders' Society will hold its 21st annual meeting at the Edgewater Beach Hotel in Chicago, Oct. 27-28, 1949.

R. L. Collier, executive vice-president, said the largest attendance in the history of GIFS is expected. The business phase of the program has been carefully developed to highlight the industry's problems. Principal speaker at the two-day meeting will be Everett M. Dirksen, former congressman from Illinois, who will speak on "Must We Control Bigness in Government?"

The program is as follows:

Thursday, October 27, 1949—H. P. Good, President, Gray Iron Founders' Society, Presiding

10:15 A.M.—Business Session—Michigan Room
Report of officers and committees

12:30 P.M.—Industry Luncheon—Crystal Ballroom
Presentation of Retiring Board of Directors
Speaker: Everett M. Dirksen, Pekin, Illinois
Subject: "Must We Control Bigness in Government?"

2:30 P.M.—Business Session—Michigan Room
Symposium on Nodular Graphitic Gray Irons
Donald Reese—International Nickel Company, New York, N. Y.
Charles Donoho—American Cast Iron Pipe Co., Birmingham, Ala.
C. O. Burgess—Gray Iron Founders' Society, Inc., Cleveland, Ohio

5:00 P.M.—Social Hour—Refreshments—West Lounge
Buffet Supper (Informal)—Ballroom

Friday, October 28

10:00 A.M.—Business Session—Michigan Room
1. Speaker: Lee Shaw, Seyfarth, Shaw & Fairweather, Chicago, Illinois
Subject: "Provisions of Labor Contracts"
2. Speaker: Edward Marker, Vice-President, Fuller & Smith & Ross, Inc., Cleveland, Ohio
Subject: "So You Want to Increase Sales?"
3. Speaker: James I. Banash, Safety Consultant, Chicago, Illinois
Subject: "Safety Begins with Top Management"
Reports of Management Group Chairmen

12:45 P.M.—Industry Luncheon—Crystal Ballroom
Introduction—New Board of Directors
Introduction—New Officers
Presentations of Citations and Awards
Speaker: Col. Jack Major
Subject: "Taxes, Women and Hawgs"

Reduces Working Force

Birmingham—Operations of the North Birmingham plant of the U. S. Pipe & Foundry Co. has been reduced from a double shift to a single shift.

Auto Settlement vs Steel Offer

Chicago—The Ford Motor Co. Welfare Plan has now been accepted by the bargaining committee of the United Automobile Workers, CIO. Part of this plan is contributory.

Ford workers will pay a part of the cost of this welfare plan in the future, as they have in the past. This plan provides group insurance protection for Ford employees. It also provides for a pension program for hourly paid workers. This (pensions) is new at Ford and is the non-contributory portion.

HOW MUCH PENSION DOES THIS PLAN PAY?

FORD AGREEMENT	INLAND OFFER
About $67 per month (including social security) after 20 years of service.	About $100 per month (including social security) for average employee after 20 years of service.
$100 per month (including social security) after 30 years of service.	About $147 per month (including social security) for average employee after 30 years of service.
$100 per month (including social security) after 35 years of service.	About $163 per month (including social security) for average employee after 35 years of service.
The most pension a Ford employee can get is $100 per month (including social security).	Some hourly paid Inland employees in the bargaining unit will get as much as $337.50 per month pension (not including social security).

WHAT DOES THE EMPLOYEE GET IF HE DECIDES TO LEAVE THE COMPANY BEFORE HE RETIRES?

He gets nothing if he doesn't stay until retirement.	He can always get out what he puts in with interest. If he has been in the plan for 5 years or more he can get everything the company put in for him, too, by leaving his money in the plan until he is 65 and drawing it out as a pension.

WHO PAYS FOR THE COST OF THE PENSIONS?

About ½ of the Ford pension is made up of social security benefits. The employees pay 50 pct of the cost of the social security benefits.	The Inland pension is in addition to the employees' social security. Inland pays about 2/3 of the cost of Inland pensions and 50 pct of the cost of the employees' social security benefits.

Data from Inland Steel Co. letter sent to all employees.

Retail Inventories Rise

Washington—With retail inventories rising some $350 million in August, according to the Office of Business Economics, the increase centered primarily in automotive stocks.

Business inventories as a whole amounted to $50.4 billion at the end of August. Reflecting increased orders after the earlier shaking down of both wholesale and retail inventories, manufacturers' inventories fell more than $500 million during the month to a total of about $29 billion.

National Farm Show Nov. 26

Chicago—The third annual National Farm Show starts here the week of Nov. 26 and will consist of a liberal education in scientific farming. The show will last to Dec. 3 and will be held at the Coliseum where at least 10 leading agricultural associations are planning educational exhibits. In addition many implement and equipment displays will be shown since the manufacturers are looking to the farm show as the means of introducing new ideas to America's approximately 28 million farm population.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1949

(Preliminary)

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	7,287,683	101.1	408,552	92.6	487,260	93.8	8,183,495	100.2	1,847,290	4.43
February	6,633,779	102.0	379,698	95.3	467,247	99.6	7,480,724	101.4	1,870,181	4.00
March	7,473,901	103.7	430,176	97.5	483,850	93.2	8,387,927	102.7	1,893,437	4.43
1st Quarter	*21,395,363*	*102.3*	*1,218,426*	*95.2*	*1,438,357*	*95.4*	*24,052,146*	*101.5*	*1,870,307*	*12.86*
April	7,015,611	100.5	404,095	94.6	365,570	72.7	7,785,276	98.4	1,814,750	4.29
May	6,889,230	95.6	400,741	90.9	299,751	57.7	7,589,722	92.9	1,713,256	4.43
June	5,954,619	85.3	349,196	81.8	194,386	38.6	6,498,201	82.2	1,514,732	4.29
2nd Quarter	*19,859,460*	*93.8*	*1,154,032*	*89.1*	*859,707*	*56.4*	*21,873,199*	*91.2*	*1,681,260*	*13.01*
1st 6 months	*41,254,823*	*98.0*	*2,372,458*	*92.1*	*2,298,064*	*75.8*	*45,925,345*	*96.3*	*1,775,236*	*25.87*
* July	5,307,471	73.8	300,236	68.2	171,415	33.1	5,779,122	70.9	1,307,494	4.42
* August	6,101,500	84.7	355,335	80.6	257,910	49.7	6,714,745	82.2	1,515,744	4.43
† September	5,978,592	85.9	350,356	82.2	243,336	48.5	6,572,284	83.3	1,535,580	4.28
† *3rd Quarter*	*17,387,563*	*81.4*	*1,005,927*	*77.0*	*672,661*	*43.7*	*19,066,151*	*78.8*	*1,452,106*	*13.13*
† *9 months*	*58,642,386*	*92.4*	*3,378,385*	*87.0*	*2,970,725*	*65.0*	*64,991,496*	*90.4*	*1,666,449*	*39.00*
October										4.43
November										4.29
December										4.42
4th Quarter										*13.14*
2nd 6 months										*26.27*
Total										*52.14*

Note—The percentages of capacity operated are calculated on weekly capacities of 1,626,717 net tons open hearth, 99,559 net tons Bessemer and 117,240 net tons electric ingots and steel for castings, total 1,843,516 net tons; based on annual capacities as of January 1, 1949 as follows: Open hearth 84,817,040 net tons, Bessemer 5,191,000 net tons, Electric 6,112,890 net tons, total 96,120,930 net tons.

† Preliminary figures, subject to revision.
* Revised.

YEAR 1948

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,770,831	95.6	343,263	77.5	366,784	80.2	7,480,878	93.7	1,688,686	4.43
February	6,247,491	94.4	340,689	82.3	359,837	84.2	6,948,017	93.1	1,678,265	4.14
March	6,845,777	96.6	363,334	82.0	409,659	89.6	7,618,770	95.4	1,719,813	4.43
1st Quarter	*19,864,099*	*95.5*	*1,047,286*	*80.6*	*1,136,280*	*84.7*	*22,047,665*	*94.1*	*1,695,974*	*13.00*
April	5,640,273	82.2	185,140	43.2	399,074	90.1	6,224,487	80.5	1,450,929	4.29
May	6,801,633	96.0	355,659	80.3	423,350	92.6	7,580,642	94.9	1,711,206	4.43
June	6,484,114	94.5	356,907	83.2	424,228	95.8	7,265,249	94.0	1,693,531	4.29
2nd Quarter	*18,926,020*	*91.0*	*897,706*	*69.0*	*1,246,652*	*92.8*	*21,070,378*	*89.9*	*1,619,552*	*13.01*
1st 6 Months	*38,790,119*	*93.3*	*1,944,992*	*74.8*	*2,382,932*	*88.8*	*43,118,043*	*92.0*	*1,657,749*	*26.01*
July	6,348,611	89.8	325,080	73.6	401,826	88.1	7,075,517	88.8	1,600,796	4.42
August	6,633,443	93.6	371,306	83.8	442,085	96.7	7,446,834	93.3	1,681,001	4.43
September	6,594,499	96.3	387,259	90.5	443,086	100.3	7,424,844	96.2	1,734,777	4.28
3rd Quarter	*19,576,553*	*93.2*	*1,083,645*	*82.6*	*1,286,997*	*95.0*	*21,947,195*	*92.7*	*1,671,530*	*13.13*
9 Months	*58,366,672*	*93.2*	*3,028,637*	*77.4*	*3,669,929*	*90.8*	*65,065,238*	*92.2*	*1,662,372*	*39.14*
October	7,120,753	100.5	409,657	92.5	466,485	102.0	7,996,895	100.1	1,805,168	4.43
November	6,925,043	100.9	411,161	95.9	461,354	104.2	7,797,558	100.8	1,817,613	4.29
December	6,927,689	98.0	393,717	89.1	459,373	100.7	7,780,779	97.7	1,760,357	4.42
4th Quarter	*20,973,485*	*99.8*	*1,214,535*	*92.5*	*1,387,212*	*102.3*	*23,575,232*	*99.5*	*1,794,158*	*13.14*
2nd 6 Months	*40,550,038*	*96.5*	*2,298,180*	*87.5*	*2,674,209*	*98.6*	*45,522,427*	*96.1*	*1,732,867*	*26.27*
Total	79,340,157	94.9	4,243,172	81.2	5,057,141	93.7	88,640,470	94.1	1,695,495	52.28

Note—The percentages of capacity operated are calculated on weekly capacities of 1,599,286 net tons open hearth, 99,962 net tons Bessemer and 103,228 net tons electric ingots and steel for castings, total 1,802,476 net tons; based on annual capacities as of January 1, 1948 as follows: Open hearth 83,610,690 net tons, Bessemer 5,226,000 net tons, Electric 5,396,770 net tons, total 94,233,460 net tons.

AISI Technical Meeting In Chicago Attended by 300

Chicago—About 300 attended the local technical meeting of the American Iron & Steel Institute held here recently. This meeting was the first in a series of six such meetings scheduled in various parts of the country this fall.

H. W. Johnson, vice-president, Inland Steel Co., presided at the morning session and A. F. Franz, vice-president, Colorado Fuel & Iron Corp., presided at the afternoon session. Walter S. Tower, president, American Iron & Steel Institute, gave a talk stressing the importance of the Chicago area in the steel industry.

At the afternoon session, four papers on technical subjects were presented. George D. Lain, research engineer of AISI, spoke on "Observations on Corrosion of Ferrous Metals." F. X. Tartaron, manager of ore research for Jones & Laughlin, delivered a paper on "Beneficiation Methods for Northern Iron Ore." J. N. Crombie, assistant metallurgical engineer of Carnegie-Illinois Steel Corp., gave a paper on "The Electrolytic and Hot Dipped Tin Plate Process" and J. G. Mravec, metallurgist of Timken steel and tube division of Timken Roller Bearing Co., spoke on "Bath Temperature Measurements."

The activities of the institute were covered by George S. Rose, secretary, who reported that a dozen divisions are engaged in a wide variety of activity. Research projects sponsored by the institute, C. M. Parker, metallurgical engineer, of AISI, said are more numerous now than ever before.

Die Assn. Schedules Convention

New York—The National Tool & Die Manufacturers Assn. will hold its annual convention at the Hotel Statler here Oct. 30 to Nov. 2.

The sessions on Monday and Tuesday afternoons will be devoted to panel discussions on tool and die shop problems. In addition, various committees will meet to discuss the different aspects of the tool and die business. New officers for the coming year will also be elected.

Rail Rates Approved by ICC Let Geneva Compete With Kaiser

Washington — Rail rates enabling the Geneva Steel Co. to compete in the West Coast steel market with Kaiser Steel Co. have been approved by the Interstate Commerce Commission.

The new rates went into effect on a temporary basis on Apr. 1, 1947. The effect of the ICC's latest action is to make the 1947 rates permanent. They apply to all iron and steel products moving from Geneva, Utah, to Pacific Coast destinations.

Buys Site for Container Plant

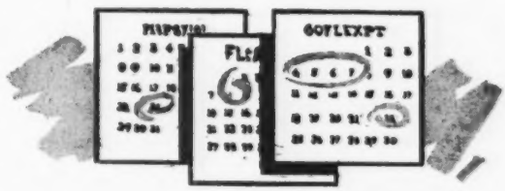
New York—American Can Co. purchased a 43-acre tract on the southwest limits of Baltimore from Baltimore & Ohio R.R. as the site for a manufacturing plant to produce paper milk containers.

Harvester Affected by Parts Shortage; 35,000 Laid Off

Chicago—McCormick works of International Harvester Co. laid off about 35,000 workers last Friday as the result of a parts shortage. International Harvester's highly integrated operations were affected first when the tractor plant was struck by the CIO Farm Equipment Workers a few weeks ago. At that time, some of the parts made by the tractor works used at McCormick works, which builds mowers, harrows, discs, etc., was affected.

Harvester officials said that the McCormick plant has plenty of steel to make its own parts but that their parts suppliers had run out of steel for some items. The first item that was affected was wheel castings. Three of International Harvester's seven foundries are also down.

McCormick works is now busy taking inventory and trying to determine if there is any use in attempting to continue production.



Dates to Remember

Oct. 17-21	**National Metal Congress**, Cleveland.
Oct. 24-26	**American Gear Manufacturers Assn.**, annual meeting, Chicago.
Oct. 26-28	**National Metal Trades Assn.**, annual convention, Chicago.
Oct. 27-28	**Gray Iron Founders Society**, annual meeting, Chicago.
Oct. 27-28	**Porcelain Enamel Institute**, annual meeting, French Lick, Ind.
Oct. 27-29	**American Society of Tool Engineers**, semiannual meeting, Montreal.
Oct. 28-29	**Engineers Council for Professional Development**, annual meeting, Chicago.
Oct. 30-Nov. 2	**National Tool & Die Manufacturers Assn.**, annual meeting, New York.
Oct. 31-Nov. 2	**Packaging Machinery Manufacturers Institute**, annual meeting, Chicago.
Oct. 31-Nov. 3	**American Institute of Steel Construction**, annual convention, White Sulphur Springs, W. Va.
Nov. 7-10	**American Institute of Chemical Engineers**, annual meeting, Pittsburgh.
Nov. 10-11	**National Foundry Assn.**, annual meeting, New York.
Nov. 30-Dec 2	**Society for Experimental Stress Analysis**, annual meeting, New York.
Dec. 8-10	**American Institute of Mining & Metallurgical Engineers**, Electric Furnace Steel Committee, annual conference, Pittsburgh.

Viewing the News from

The ECONOMIC SIDE

By JOSEPH STAGG LAWRENCE

"A clue to labor trouble"

THE meeting of the Governors of the International Monetary Fund in Washington during the middle of September has thrown a revealing light on the postwar monetary plans of the 44 nations which met at Bretton Woods in 1944.

Dominated by British intellectuals under the leadership of John Maynard Keynes, the conferees decided that World War II would not be followed by deflation. Such deflation followed the Napoleonic, Civil and First World Wars and the bright boys at Bretton Woods said: "This, we will not let happen again."

The formula of prevention was simply inflation. The test of good money management was to be full employment and stable or rising domestic prices. Governments would use their credit and power over money to prevent deflation.

The moment any unemployment appeared the credit of the state would be used to pour money into the spending stream. To keep public psychology quiescent and prevent a flight from currency, the price of gold would remain fixed.

Stringent controls would be imposed on the movement of capital. Exchange rates would be kept stable through the instrumentality of the fund. All this would prevent the public from knowing the degree of depreciation in the currency which was actually taking place.

That a definite compact for this purpose was made by the 44 conferees has been disclosed by Nicholas Havenga, the Finance Minister of South Africa, in his speech to the governors of the fund on Sept. 13. He spilled the beans because he felt the gold producers were the victims of this plan.

He also accused the other members of welching on an agreement to protect the gold producers from the consequences of rising costs and fixed gold prices. A sense of injury sometimes has its uses.

It is abundantly clear that the government of the United States is following the course laid out at Bretton Woods in 1944. Last spring the President noted some unemployment. Although there were 12 million more jobs than in the flush year of 1929, and the jobs were all substantially better than they had been 20 years earlier, the President nevertheless urged that the government go into the red in order to maintain full employment.

In April the gross federal debt was $251.5 billion. Four months later, in August, it was $255.8 billion.

Congress has shown great timidity in approaching the problem of normal agricultural prices. It has resisted flexible price supports which would permit a reduction in support levels as supplies increased. It is certain that these subsidies to the farmer this year will amount to not less than $3 billion, and possibly as much as $4 billion. The purpose —to maintain wartime income levels for the farmer and high prices for the consumer, who is also the fellow who pays the cost of price support.

Finally, the government has condoned—perhaps incited is the better word—three successive rounds of wage increases and artfully set the stage for a fourth.

This background provides some clue to the attitude of government toward strikes which may paralyze the economy. In spite of this risk there must be no reversal of the price trend. Honest money? Only reactionaries raise that question.

Construction Steel Awards

Fabricated steel awards this week included the following:

2950 Tons, McKeesport, Pa., boiler plant for National Tube Co., through Stone and Webster Engineering Corp. to American Bridge Co., Pittsburgh.
160 Tons, Norfolk, Va., Reeve Ave. power plant for Virginia Electric Power Co., through Stone and Webster Engineering Corp., to Bristol Steel Iron Co., Bristol, Va.
105 Tons, Johnstown, R. I., St. Rocco's Church through Gilbane Building Co., Providence, R. I., to A. O. Wilson Structural Steel Co., Cambridge, Mass.

Fabricated steel inquiries this week included the following:

2300 Tons, New York City, reconstruction of Brooklyn Bridge, due Oct. 24.
1610 Tons, San Diego, bridge and approach at Midway Drive, City Clerk, San Diego, bids to Nov. 15.
1190 Tons, Bridgeport, Wash., bridge over Columbia River, Seattle District, Corps of Engineers, Serial No. CIVENG-45-108-50-20, bids to Nov. 9.
175 Tons, Gila County, Ariz., road construction at Verde Valley-Roosevelt Dam, Bureau of Public Roads, Phoenix, bids to Oct. 25.
140 Tons, San Diego County, Calif., bridges and road construction in National City, California Div. of Highways, Los Angeles, bids to Oct. 27.

Reinforcing bar awards this week included the following:

2700 Tons, Philadelphia, Queen Lane filter plant, City of Philadelphia, through Progressive Builders, Inc., Pensauken, N. J., to Bethlehem Steel Co., Bethlehem.
800 Tons, Chicago, Sheridan Rd. apartment building to Truscon Steel Co., Youngstown, Ohio.
690 Tons, Chicago, TB Hospital to Ceco Steel Products Co., Chicago.
570 Tons, Cook Country, Ill., hospital dormitory for internes and visitors, to J. T. Ryerson and Sons, Chicago.
465 Tons, Chicago, Housing Relocation Site No. 6, to U. S. Steel Supply Co., Chicago.
275 Tons, Chicago, Burlington Freight House to J. T. Ryerson and Sons, Chicago.
270 Tons, Bala-Cynwyd, Pa., Van Sciver store, through Lauter Construction Co., Philadelphia, to Concrete Steel Co., Philadelphia.
210 Tons, Aurora, Ill., highway bridge to Bethlehem Steel Co., Bethlehem.
150 Tons, York, Pa., poorhouse run culvert, through J. Richard Missley, Landisville, Pa., to Bethelehem Steel Co., Bethlehem.
140 Tons, Chicago, Weber High School to Dean Steel Co., Chicago.
120 Tons, Winnebago, Wis., state hospital building to Truscon Steel Co., Youngstown, Ohio.
120 Tons, Chicago, building for Phelp and Terrant Mfg. Co., to Concrete Steel Co., Chicago.
115 Tons, Indianapolis, Ind., building for Equitable Life Assurance Co. to H. J. Baker Co., Indianapolis.
100 Tons, Chicago, St. John Parish building to J. T. Ryerson and Sons, Chicago.

Reinforcing bar inquiries this week included the following:

780 Tons, Yuma, Ariz., construction Wellton-Mohawk pumping plants 1, 2 and 3, Bureau of Reclamation, Yuma, bids to Nov. 9.
550 Tons, Los Angeles, undercrossings on Harbor Freeway at 1st and 2nd Sts., California Div. of Highways, Los Angeles, bids to Nov. 10.
530 Tons, San Diego County, Calif., bridges and road construction in National City, California Div. of Highways, Los Angeles, bids to Oct. 27.
500 Tons, West Chester, Pa., high school, due Oct. 20.
155 Tons, Lompoc, Calif., flood channel and appurtenances, Cebada and Purisima watersheds, Soil Conservation Service, Lompoc, bids to Oct. 31.

Briefs and Bulletins

long strike ends—The recent ending of 5-month long strikes at the Elizabeth, N. J., and Bridgeport, Conn., plants of Singer Sewing Machine Co. presents the possibility of an early end to the strike at the Carteret, N. J., refinery of U. S. Metals Refining Co., American Metals Co. subsidiary. In both strikes the principal issue was an incentive plan. The Singer union finally gave up its attempt to kill the incentive plan. It also failed to gain a general wage increase. Workers not covered by the incentive plan were given boosts of 2¢ to 6¢ an hr.

back at work—The Farm Equipment Workers, CIO, ended the strike started on Sept. 20 at the tractor works of the International Harvester Corp. plant on Oct. 12, figuring that its members would be unable to draw unemployment compensation when the plant runs out of steel in November. Production was scheduled to start Oct. 20. By the end of this week the plant should be in full production and will run at prestrike levels until steel supplies are gone.

steel price boost—A $10 a ton increase in prices of some strip and wire products was made last week by John A. Roebling's Sons Co., following its settlement with the union. The company agreed to pay 4¢ and 6¢ an hr for insurance and pension, less credit for payments on the company's existing contributory plan. There was no strike over the contributory issue because the company agreed to apply the industry pattern to the new agreement.

stable prices—There was a general stabilization of prices during September, according to the business survey committee, Purchasing Agents Assn. of Chicago. For the second consecutive month, over three-quarters of those reporting indicated no price changes. The balance were evenly divided in reporting that their prices went up or down.

employment outlook—Industrial unemployment will reach 2 million if the steel strike is not settled by Nov. 1, Commerce Secretary Sawyer warned this week. By December the unemployment total resulting directly from the strike would reach 5 million, he predicted.

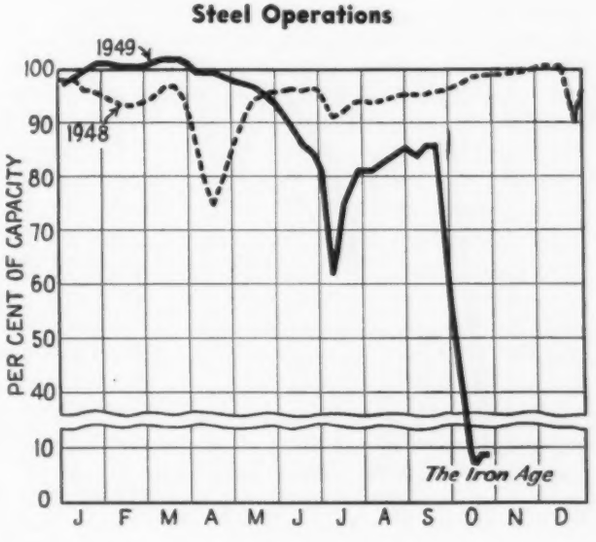
treasury loss—The steelworkers are not the only ones suffering a loss due to the strike. The U. S. Treasury is losing $1 million a day while the steel companies are shut down.

another walkout—On Oct. 17 between 450 and 500 workers of the steelworkers union struck the Calumet Steel Div., Borg-Warner Corp., Chicago Heights, Ill., which had been operating under an extension which expired the 17th. Calumet offered the 6¢ and 4¢ package on a contributory basis. The union refused it and this rerolling plant is now down. Office workers are permitted to come and go as well as supervisory employees and union maintenance crews.

steel production—The steel strike materially affected the production of steel in the third quarter of this year. Production was 19,066,000 tons, smallest for any quarter since early 1946, according to the American Iron & Steel Institute. Steel production in September totaled 6,572,000 tons compared with a revised figure of 6,714,000 tons in August.

freight cars—Domestic freight car deliveries during September totaled 6141, according to the American Railway Car Institute. August production was 7178 cars. The backlog of orders as of Oct. 1 was: car builders, 10,216; railroad shops, 11,987; total, 22,203. This compares with 28,731 on Sept. 1 and 108,892 a year ago.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
October 9	3.5	4.5	.....	7.0	.....	.....	64.5	.....	.....	20.0	37.0	45.0	22.0	9.0
October 16	3.5	4.5	.....	7.0	.....	.....	65.0	.....	.....	24.0	40.5	84.5	42.5	9.5

Nonferrous METALS OUTLOOK

Market Activities

by John Anthony

Zinc price reductions halted by some plant shutdowns . . . Copper demand continues heavy . . . Lead cut another ¾¢ . . . O'Mahoney mine subsidy bill not passed.

New York—So far the effect of the steel strike on the metal markets has been minimized to some extent by strikes now under way at nonferrous metal producing plants. Buying of zinc is quite active in some grades, spurred on by strikes at Palmerton, Pa.; Kellogg, Idaho, and Donora, Pa. There is very little buying of Prime Western for galvanizing. But the other grades required by die casters and brass mills are moving. The zinc plant shutdowns have removed the immediate threat of further price reductions. As the steel strike continues, the consumers of steel will be forced to shut down their operations and cut off their requirements for metals.

The demand for copper is continuing very heavy. There is no doubt now that if it had not been for the steel strike, there would have been an increase in the price of copper. It is understood that 18,000 tons of copper were sold last Friday. The September figures of the Copper Institute showed a decrease of 23,277 tons in stocks, bringing refined stocks down to 193,890 tons at the end of the month. Deliveries in the month were 103,115 tons, well above the refined production of 79,949 tons.

NONFERROUS METALS PRICES

	Oct. 13	Oct. 14	Oct. 15	Oct. 17	Oct. 18
Copper, electro, Conn.	17.625	17.625	17.625	17.625	17.625
Copper, Lake, Conn.	17.75	17.75	17.75	17.75	17.75
Tin, Grade A, New York	95.75	95.75	95.75	95.75	95.75
Zinc, East St. Louis	9.25	9.25	9.25	9.25	9.25
Lead, St. Louis	13.55	12.85	12.85	12.80	12.80

Note: Quotations are going prices.

The lead market is still suffering from the competition of foreign supplies, coupled with the effect of the steel strike on demand. A custom smelter initiated another price reduction of ¾¢ on Oct. 14, which was followed by other principal producers several days later. Some observers expect that the market can be expected to reach 12¢ before being stabilized.

O'Mahoney Bill Killed

The O'Mahoney mine subsidy bill failed to pass the House on Monday when the two-thirds majority needed to suspend the rules could not be obtained. Last week the House Rules Committee failed to vote the measure out to the floor of the House. Observers believe that this development will kill the possibility of subsidy legislation for this session.

The strike at the nine plants of the Aluminum Co. of America went into effect on Monday. These plants are at Alcoa, Tenn., Badin, N. C., Edgewater, N. J., New Kensington, Pa., Bridgeport, Conn., Detroit, and Richmond, Ind. A mine at Bauxite, Ark., and an Alumina plant at Mobile, Ala., were also strikebound. While the loss of production from these plants, estimated at 50 pct of the company's productive capacity, could ordinarily bring about a serious shortage of the aluminum products, it is not expected to do so at this time. Inventories of aluminum on hand should serve as a cushion until curtailed steel supplies force a gradual tapering off in aluminum.

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 75S-O, 75S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 75S-O, 75S-OAL, 38¢; 0.032 in., 2S, 3S, 29.5¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 75S-O, 75S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 75S-F, 75S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4, 33.6¢ to 64¢; 11 to 13, 34.6¢ to 76¢; 23 to 25, 36.7¢ to $1.05; 35 to 37, 44¢ to $1.53; 47 to 49, 63.5¢ to $2.20.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ⅛ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ⅜ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ⅜ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1 9/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2⅛ to 3⅜ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 75S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheets and Plate: Ma, FSa, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-$1.01; 22, $1.22-$1.31; 24, $1.62-$1.75. Specification grade higher.

Extruded Round Rod: M, diam in., ¼ to 0.311, 58¢; ⅜ to ¾, 46¢; 1¼ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ⅜ to 0.749, 48¢; 1¼ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangle: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb per ft, per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft, per. up to 5.9 in., 51¢; 0.50 to 0.59 lb per ft, per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft, per. up to 19.5 in., 44¢; 4 to 6 lb per ft, per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.14; 5/16 to ⅜, $1.02; ½ to ⅝, 76¢; 1 to 2 in., 65¢; 0.065 to 0.082, ⅜ to 7/16, 85¢; ⅝ to ¾, 62¢; 1 to 2 in., 57¢; 0.165 to 0.219, ⅝ to ¾, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Base prices, cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	66	50
Rods and bars	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks		40

Copper, Brass, Bronze

(Cents per lb, freight prepaid on 200 lb)

	Sheets	Rods	Extruded Shapes
Copper	31.30	....	30.90
Copper, h-r	....	27.15	....
Copper, drawn	....	28.40	....
Low brass	29.47	29.16	32.38*
Yellow brass	28.19	27.88	31.20*
Red brass	29.89	29.58	32.80*
Naval brass	33.13	27.19	28.44
Leaded brass	....	22.76	26.85
Com'l bronze	30.84	30.53	33.50*
Manganese bronze	36.63	30.54	32.04
Phosphor bronze	50.47	50.72	....
Muntz metal	31.15	26.71	27.96
Everdur, Herculoy, Olympic, etc	36.19	35.14	....
Nickel silver, 10 pct	39.12	41.41	41.44
Arch. bronze	....	....	26.85

*Seamless tubing.

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	32.00
Beryllium copper, 3.75-4.25% Be	dollars per lb contained Be..... $24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	$52.00
Bismuth, ton lots	$2.00
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$1.80 to $1.87
Copper, electro, Conn. Valley	17.625
Copper, lake, Conn. Valley	17.75
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$100 to $110
Lead, St. Louis	12.80
Lead, New York	13.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb flask f.o.b. New York	$72 to $75
Nickel, electro, f.o.b. New York	42.97
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$69 to $72
Silver, New York, cents per oz.	73.25
Tin, New York	95.00 to 96.00
Zinc, East St. Louis	9.25
Zinc, New York	9.97
Zirconium copper, 10-12 pct Zr, per lb contained Zr	$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot		
No. 115	15.00*	16.50
No. 120	14.50*	16.00
No. 123	14.00*	15.50
80-10-10 ingot		
No. 305	.....	21.00
No. 315	.....	18.00
88-10-2 ingot		
No. 210	.....	27.50
No. 215	.....	24.50
No. 245	17.50*	19.75
Yellow ingot		
No. 405	12.75*	14.25
Manganese bronze		
No. 421	.....	19.00

* F.o.b. Philadelphia.

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	18.75-19.00
0.60 copper, max.	18.50-18.75
Piston alloys (No. 122 type)	16.75
No. 12 alum. (No. 2 grade)	15.50-16.00
108 alloy	16.25-16.75
195 alloy	17.25-17.50
13 alloy	18.50-18.75
AXS-679	16.50-16.75
5% Ti, Aluminum, f.o.b., Eddystone, Pa.	
Low copper	31.00
2% copper	28.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	16.75-17.25
Grade 2—92-95%	15.75-16.25
Grade 3—90-92%	14.75-15.25
Grade 4—85-90%	13.75-14.25

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	34⅝
Electrodeposited	28⅞
Rolled, oval, straight, delivered	31.46
Ball anodes	32⅞
Brass, 80-20	
Cast, oval, 15 in. or longer	30⅝
Zinc, oval, 99.886, f.o.b. Detroit	17¼
Ball anodes	16¼
Nickel 99 pct plus	
Cast	59.00
Rolled, depolarized	60.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	45.00
Copper sulfate, 99.5 crystals, bbl.	11.10
Nickel salts, single or double, 4-100 lb bags, frt allowed	18.00
Nickel chloride, 300 lb bbl	24.50
Silver cyanide, 100 oz lots, per oz.	59
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc sulfate, crystals, 22.5 pct, bags	6.75
Zinc sulfate, 25 pct, flakes, bbl.	7.75

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	14⅝	13⅜
Yellow brass	12	11
Red brass	13¼	12½
Commercial bronze	13½	12⅝
Manganese bronze	11⅝	10⅞
Leaded brass rod ends	11¾	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	13.75
No. 2 copper wire	12.75
Light copper	11.75
Refinery brass	11.75*
Radiators	8.75

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	13.50
No. 2 copper wire	12.50
Light copper	11.50
No. 1 composition	10.75
No. 1 comp. turnings	10.25
Rolled brass	8.75
Brass pipe	9.25
Radiators	8.75
Heavy yellow brass	8.50
Aluminum	
Mixed old cast	10.00-10.50
Mixed old clips	10.00-10.50
Mixed turnings, dry	8.50- 9.00
Pots and pans	10.00-10.50
Low copper	11.50

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	12 —12⅛
No. 2 heavy copper and wire	11 —11⅛
Light copper	10 —10¼
Auto radiators (unsweated)	7¼— 7½
No. 1 composition	9 — 9¼
No. 1 composition turnings	8½— 8¾
Clean red car boxes	7½— 7¾
Cocks and faucets	7½— 7¾
Mixed heavy yellow brass	6 — 6¼
Old rolled brass	7¼— 7⅜
Brass pipe	8¼— 8½
New soft brass clippings	10 —10½
Brass rod ends	7¾— 8
No. 1 brass rod turnings	7½— 7⅝
Aluminum	
Alum. pistons and struts	5 — 5½
Aluminum crankcases	7 — 8
2S aluminum clippings	10½—11
Old sheet and utensils	7 — 8
Borings and turnings	4
Misc. cast aluminum	7 — 8
Dural clips (24S)	7 — 8
Zinc	
New zinc clippings	5½— 6
Old zinc	3½— 4
Zinc routings	2¼— 2⅜
Old die cast scrap	2½— 2⅝
Nickel and Monel	
Pure nickel clippings	21 —23
Clean nickel turnings	14 —16
Nickel anodes	20 —22
Nickel rod ends	20 —22
New Monel clippings	12 —14
Clean Monel turnings	8 — 9
Old sheet Monel	10 —12
Old Monel castings	9 —10
Inconel clippings	11 —13
Nickel silver clippings, mixed	8 —10
Nickel silver turnings, mixed	6 — 7
Lead	
Soft scrap, lead	9¼— 9½
Battery plates (dry)	4½— 4⅝
Magnesium	
Segregated solids	9 —10
Castings	5½— 6½
Miscellaneous	
Block tin	70 —72
No. 1 pewter	43 —45
No. 1 auto babbitt	38 —40
Mixed common babbitt	10 —10¼
Solder joints	11½—12
Siphon tops	44 —46
Small foundry type	12½—13
Monotype	11½—12
Lino. and stereotype	10¾—11¼
Electrotype	9¾—10¼
New type shell cuttings	9
Hand picked type shells	4 — 4½
Lino. and stereo. dross	4¾— 5
Electro. dross	2¾— 3

MARKETS—PRICES—TRENDS

SCRAP
Iron & Steel

Prices Firm; Borings, Turnings In Demand

Although the steel strike has entered its third week, the market remained firm and quiet. Some weaknesses were in evidence but not enough to warrant a change in the general trend of the market. The steelmaking grades were still being bought at prices within the range of the previous week and it was felt that offerings of lower prices by the mills would not be accepted by the brokers. Borings and turnings were in good demand, with some mills laying down these items for blast furnace use when they will again resume operations. As a result of this, a rise of $1.00 was recorded in Chicago and 50¢ in Pittsburgh. In Pittsburgh the bottom price of No. 1 steel was off 50¢ but the top quotation of $30.00 still held. This decline of 50¢ resulted in a drop of 8¢ per gross ton in THE IRON AGE scrap composite to $26.50.

PITTSBURGH — The market showed signs of weakening here this week as the deadlock in the steel strike continued. Opinion among brokers and consumers added up to uncertainty, with the result that the price of No. 1 heavy melting continued at a tentative top of $30.00. One large consumer, although not now operating, was able to buy about 1500 tons in scattered lots at $29.00, and reports were that two mills not now affected by the strike were holding out for a lower price—$28.00 in one case—but were as yet getting no takers. There was one sale early in the week at $30.00 for an excellent grade. The trade conceded that the market appeared to be on dead center, with the odds in favor of a decline, perhaps this week.

CHICAGO—The market remained firm but quiet here except that considerable activity appeared in turnings and borings. A few mills are laying down good quantities of these items mostly for blast furnace to be used when the mills start operations. A differential still exists between dealer turnings and industry turnings but this may not last long. Railroad scrap prices generally showed a moderate increase and cast iron strengthened. Part of the reason for cast iron picking up is a hedge against a pig iron shortage, as yet pig iron isn't short but as the coal and coke stocks dwindle further iron will become scarce.

PHILADELPHIA—There was no activity in the scrap market here. Shipments were being held up by strike bound mills, and those operating were not buying at current market prices. But there was no evidence of a bearish feeling in dealer circles. Yards are heavy with inventories, but so far there have been no real financial or storage space difficulties. The fast approaching winter is the most obvious cause of the bullish dealer sentiment. Sales by the Navy Yard last week were at prices which would substantiate even higher quoted prices when freight and preparation costs are taken into consideration. The only price change is a $1.00 increase in chemical borings.

NEW YORK — Activity in the market here is at standstill. Some material has moved within the range of the quoted prices. Reports indicate that there are very few orders out at the present time. Foundries are practically out of the market and have curtailed their operations due to a lack of coke. Chemical borings were somewhat weaker and are off 50¢. Yards have been receiving material but so far there is no indication that there will be a shortage of storage space.

DETROIT — The market here is very quiet except for some energetic activity on the part of dealers and brokers trying to find storage space for scrap being purchased under contracts. In the absence of any sales in quantity, prices are being held at the level of the previous week. A typographical error occurred in the prices published Oct. 13. The price of mixed borings and turnings should have been $11.00—$12.00 instead of $14.00—$15.00.

CLEVELAND — Big yard operators were still laying down tonnage here this week as movement of some of the dealer grades to the Pittsburgh district was reported. At present, an estimated 75,000 tons of scrap is on the ground between the yards here and in the Valley. Dealers report some willingness on the part of plants to unload tonnage at reduced prices, but by and large very little distressed scrap has been offered.

BOSTON—Most prices were firm, but drops in the turning grades, and better prices in cast highlighted the market here, pending the end of the strike. No. 1 heavy melting was still bringing $17.00 to $18.00. Cast, especially heavy breakable and stove plate stiffened in price with the former up $5.00 and the latter up $1.00.

BUFFALO—In the absence of new sales to consumers, scrap prices are nominally unchanged as the steel strike enters its third week. However, weaker tendencies are noticed in some instances as $1.00 less is being paid for material moving into the yard of a leading dealer. There were indications that other dealers are planning to take similar steps as protection against a prolonged steel strike.

CINCINNATI — A strong undertone was the dominant factor in the scrap market here this week, with two major consumers continuing to operate and movement of some tonnage by barge to Weirton reported. Sale of limited tonnage of No. 1 and No. 2 steel and blast furnaces grades within this district was rumored. Which is ample incentive to the yard men to hold on to their tonnage. Movement of foundry grades is at low ebb and the problem is to get an order rather than meet price.

BIRMINGHAM—The only material moving here at present is cast iron and very little of that. The general price undertone is weak and mills, shutdown by the strike, are making no commitments. Railroads in this area are not making scrap sales this month.

ST. LOUIS—Although steel mills in the St. Louis industrial district bought heavily as reported last week they are continuing to buy additional scrap iron at the present levels. One mill has cut its price on No. 2 bundled sheets but brokers' prices are unchanged. The feeling in the market is that if the offerings of scrap should increase as a result of the steel strike in other centers there would be a break in prices.

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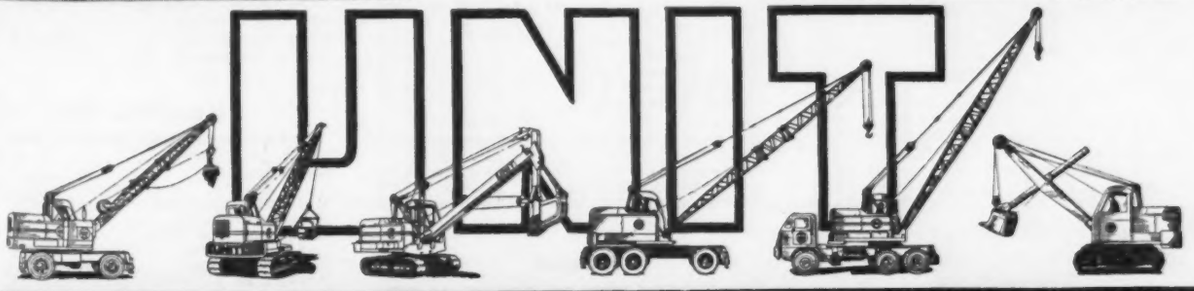

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A 5457-1P-C

Scrap IRON & STEEL Prices

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	23.00 to 24.00
Machine shop turn.	20.00 to 20.50
Mixed bor. and ms. turn.	20.00 to 20.50
Shoveling turnings	22.00 to 22.50
Cast iron borings	21.00 to 21.50
Low phos. plate	31.50 to 32.00
Heavy turnings	24.00 to 25.00
No. 1 RR. hvy. melting	30.50 to 31.00
Scrap rails, random lgth.	34.00 to 35.00
Rails 2 ft and under	38.00 to 39.00
RR. steel wheels	33.00 to 34.00
RR. spring steel	33.00 to 34.00
RR. couplers and knuckles	33.00 to 34.00
No. 1 machinery cast.	39.00 to 40.00
Mixed yard cast.	36.00 to 37.00
Heavy breakable cast.	29.00 to 30.00
Malleable	32.00 to 33.00

Chicago

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 factory bundles	25.00 to 26.00
No. 1 dealers' bundles	21.00 to 22.00
No. 2 dealers' bundles	19.00 to 20.00
Machine shop turn.	18.00 to 19.00
Mixed bor. and turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Cast iron borings	17.00 to 18.00
Low phos. forge crops	33.00 to 34.00
Low phos. plate	30.00 to 31.00
No. 1 RR. hvy. melting	31.00 to 32.00
Scrap rails, random lgth.	38.00 to 39.00
Rerolling rails	43.00 to 44.00
Rails 2 ft and under	42.00 to 43.00
Locomotive tires, cut	39.00 to 40.00
Cut bolsters & side frames	33.00 to 35.00
Angles and splice bars	35.00 to 36.00
RR. steel car axles	44.00 to 45.00
No. 3 steel wheels	32.50 to 33.50
RR. couples and knuckles	34.00 to 35.00
No. 1 machinery cast.	41.00 to 43.00
No. 1 agricul. cast.	40.00 to 41.00
Heavy breakable cast.	32.00 to 34.00
RR. grate bars	30.00 to 31.00
Cast iron brake shoes	30.00 to 31.00
Cast iron car wheels	32.00 to 34.00
Malleable	36.00 to 37.00

Philadelphia

No. 1 hvy. melting	$24.00 to $25.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 bundles	24.00 to 25.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	16.00 to 17.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.50 to 17.50
Low phos. punchings, plate	26.00 to 26.50
Low phos. 5 ft and under	25.00 to 26.00
Low phos. bundles	24.50 to 25.00
Hvy. axle forge turn.	24.00 to 25.00
Clean cast chem. borings	25.00 to 26.00
R.R. steel wheels	26.00 to 28.00
RR. spring steel	26.00 to 28.00
No. 1 machinery cast	35.00 to 36.00
Mixed yard cast	32.00 to 33.00
Heavy breakable cast	32.00 to 33.00
Cast iron carwheels	34.00 to 35.00
Malleable	34.00 to 35.00

Cleveland

No. 1 hvy. melting	$26.50 to $27.00
No. 2 hvy. melting	24.00 to 24.50
No. 1 bushelings	26.50 to 27.00
No. 1 bundles	26.50 to 27.00
No. 2 bundles	19.50 to 20.00
Machine shop turn.	16.00 to 16.50
Mixed bor. and turn.	17.50 to 18.00
Shoveling turnings	17.50 to 18.00
Cast iron borings	17.50 to 18.00
Low phos. 2 ft and under	28.00 to 28.50
Steel axle turn.	26.50 to 27.00
Drop forge flashings	26.50 to 27.00
No. 1 RR. hvy. melting	32.00 to 33.00
Rails 3 ft and under	40.00 to 41.00
Rails 18 in. and under	41.00 to 42.00
No. 1 machinery cast.	43.00 to 44.00
RR. cast.	43.00 to 44.00
RR. grate bars	32.00 to 33.00
Stove plate	36.00 to 37.00
Malleable	38.00 to 39.00

Youngstown

No. 1 hvy. melting	$30.50 to $31.00
No. 2 hvy. melting	28.00 to 28.50
No. 1 bundles	30.50 to 31.00
No. 2 bundles	$22.00 to $22.50
Machine shop turn.	16.50 to 17.00
Shoveling turnings	19.50 to 20.00
Cast iron borings	19.50 to 20.00
Low phos. plate	31.50 to 32.00

Buffalo

No. 1 hvy. melting	$28.00 to $28.50
No. 2 hvy. melting	25.50 to 26.00
No. 1 busheling	25.50 to 26.00
No. 1 bundles	27.00 to 27.50
No. 2 bundles	24.00 to 24.50
Machine shop turn.	19.50 to 20.00
Mixed bor. and turn.	19.50 to 20.00
Shoveling turnings	21.50 to 22.00
Cast iron borings	19.50 to 20.00
Low phos. plate	28.50 to 29.00
Scrap rails, random lgth.	31.50 to 32.00
Rails 2 ft and under	36.50 to 37.00
RR. steel wheels	32.00 to 33.00
RR. spring steel	32.00 to 33.00
RR. couplers and knuckles	32.00 to 33.00
No. 1 cupola cast	37.00 to 37.50
Mixed yard cast	37.50 to 38.00
Stove plate	36.50 to 37.00
Small indus. malleable	24.00 to 25.00

Birmingham

No. 1 hvy. melting	$25.00
No. 2 hvy. melting	24.00
No. 2 bundles	22.00
No. 1 busheling	24.00
Machine shop turn.	$16.00 to 17.00
Shoveling turnings	19.00
Cast iron borings	18.00
Bar crops and plate	29.00 to 30.00
Structural and plate	29.00 to 30.00
No. 1 RR. hvy. melt.	28.00 to 28.50
Scrap rails, random lgth.	29.00 to 30.00
Rerolling rails	35.00 to 36.75
Rails 2 ft and under	34.00 to 35.00
Angles & splice bars	32.00 to 33.00
Std. steel axles	28.00 to 29.00
No. 1 cupola cast	34.00 to 35.00
Stove plate	28.00
Cast iron carwheels	23.00 to 24.00

St. Louis

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	25.00 to 26.00
No. 2 bundled sheets	25.00 to 26.00
Machine shop turn.	19.00 to 20.00
Shoveling turnings	19.00 to 20.00
Rails, random lengths	31.00 to 32.00
Rails 3 ft and under	33.00 to 34.00
Locomotive tires, uncut	27.00 to 28.00
Angles and splice bars	33.00 to 34.00
Std. steel car axles	35.00 to 37.00
RR. spring steel	29.00 to 30.00
No. 1 machinery cast	36.00 to 38.00
Hvy. breakable cast.	31.00 to 32.00
Cast iron brake shoes	31.00 to 32.00
Stove plate	33.00 to 35.00
Cast iron car wheels	34.00 to 35.00
Malleable	30.00 to 32.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$18.50 to $19.00
No. 2 hvy. melting	17.00 to 18.00
No. 2 bundles	15.00 to 16.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	11.00 to 12.00
Clean cast chem. bor.	20.50 to 21.50
No. 1 machinery cast.	30.00 to 32.00
Mixed yard cast.	29.00 to 31.00
Charging box cast.	24.00 to 26.00
Heavy breakable cast.	26.00 to 27.00
Unstrp. motor blocks	25.00 to 26.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$17.00 to 18.00
No. 2 hvy. melting	15.00 to 16.00
No. 1 bundles	17.00 to 18.00
No. 2 bundles	$15.00 to $16.00
Machine shop turn.	9.50 to 10.00
Mixed bor. and turn.	9.00 to 9.50
Shoveling turnings	10.50 to 11.00
No. 2 busheling	11.00 to 12.00
Clean cast chem. borings	15.50 to 16.50
No. 1 machinery cast.	32.00 to 34.00
No. 2 machinery cast.	28.00 to 29.00
Heavy breakable cast.	25.00 to 26.00
Stove plate	25.00 to 26.00

Detroit

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$17.00 to $18.00
No. 2 hvy. melting	15.00 to 16.00
No. 1 bundles	19.00 to 20.00
New busheling	17.00 to 18.00
Flashings	17.00 to 18.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. plate	17.00 to 18.00
No. 1 cupola cast	33.00 to 34.00
Heavy breakable cast	27.00 to 28.00
Stove plate	26.00 to 27.00
Automotive cast	33.00 to 34.00

Cincinnati

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	$25.50 to $26.00
No. 2 hvy. melting	21.50 to 22.00
No. 1 bundles	25.50 to 26.00
No. 2 bundles	19.50 to 20.00
Machine shop turn.	12.50 to 13.00
Mixed bor. and turn.	12.50 to 13.00
Shovelings turnings	15.50 to 16.00
Cast iron borings	14.50 to 15.00
Low phos. 18 in. under	34.00 to 35.00
Rails, random lengths	34.00 to 35.00
Rails, 18 in. and under	44.00 to 45.00
No. 1 cupola cast	40.00 to 41.00
Hvy. breakable cast	34.00 to 35.00
Drop broken cast	43.00 to 44.00

San Francisco

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Machine shop turn	9.00
Elec. fur 1 ft and under	28.00
No. 1 RR. hvy. melting	17.00
Scrap rails, random lgth.	17.00
No. 1 cupola cast.	30.00

Los Angeles

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	16.00
No. 2 bundles	16.00
No. 3 bundles	13.00
Mach. shop turn.	12.00
Elec. fur. 1 ft and under	30.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	$36.00 to 40.00

Seattle

No. 1 hvy. melting	$16.00
No. 2 hvy. melting	16.00
No. 1 bundles	15.00
No. 2 bundles	15.00
No. 3 bundles	12.00
Elec. fur. 1 ft and under	21.00
RR. hvy. melting	19.00
No. 1 cupola cast	$20.00 to 27.00
Heavy breakable cast	20.00

Hamilton, Ont.

Cast grades f.a.b. shipping point:

No. 1 hvy. melting	$20.00
No. 1 bundles	20.00
No. 2 bundles	19.50
Mechanical bundles	18.00
Mixed steel scrap	16.00
Mixed bor. and turn.	14.00
Rails, remelting	20.00
Rails, rerolling	23.00
Bushelings	14.50
Bush., new fact, prep'd	18.00
Bush., new fact, unprep'd.	13.00
Short steel turnings	14.00
Cast scrap	$33.00 to 35.00

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Oct. 18, 1949	Oct. 11, 1949	Sept. 20, 1949	Oct. 19, 1948
Hot-rolled sheets	3.25	3.25	3.25	3.26
Cold-rolled sheets	4.00	4.00	4.00	4.00
Galvanized sheets (10 ga)	4.40	4.40	4.40	4.40
Hot-rolled strip	3.25	3.25	3.25	3.265
Cold-rolled strip	4.038	4.038	4.038	4.063
Plates	3.40	3.40	3.40	3.42
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	33.00	33.00	33.00	33.25
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes	$7.75	$7.75	$7.75	$6.80
Tinplate, electro (0.50 lb)	6.70	6.70	6.70	6.00
Special coated mfg. ternes	6.65	6.65	6.65	5.90
Bars and Shapes: (cents per pound)				
Merchant bars	3.35	3.35	3.35	3.37
Cold-finished bars	3.995	3.995	3.995	3.995
Alloy bars	3.75	3.75	3.75	3.75
Structural shapes	3.25	3.25	3.25	3.25
Stainless bars (No. 302)	28.50	28.50	28.50	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.15	4.15	4.15	4.256
Rails: (dollars per 100 lb)				
Heavy rails	$3.20	$3.20	$3.20	$3.20
Light rails	3.55	3.55	3.55	3.55
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$52.00	$52.00	$52.00	$52.00
Slabs, rerolling	52.00	52.00	52.00	52.00
Forging billets	61.00	61.00	61.00	61.00
Alloy blooms, billets, slabs	63.00	63.00	63.00	63.00
Wire rod and Skelp: (cents per pound)				
Wire rods	3.40	3.40	3.40	3.619
Skelp	3.25	3.25	3.25	3.25

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Pig Iron: (per gross ton)	Oct. 18, 1949	Oct. 11, 1949	Sept. 20, 1949	Oct. 19, 1948
No. 2, foundry, Phila.	$50.42	$50.42	$50.42	$51.56
No. 2, Valley furnace	46.50	46.50	46.50	46.50
No. 2, Southern Cin'ti	46.08	46.08	46.08	49.47
No. 2, Birmingham	39.38	39.38	39.38	43.38
No. 2, foundry, Chicago†	46.50	46.50	46.50	46.50
Basic del'd Philadelphia	49.92	49.92	49.92	50.76
Basic, Valley furnace	46.00	46.00	46.00	46.00
Malleable, Chicago†	46.50	46.50	46.50	46.50
Malleable, Valley	46.50	46.50	46.50	46.50
Charcoal, Chicago	68.56	68.56	68.56	73.78
Ferromanganese‡	173.40	173.40	173.40	161.71

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	*$29.50*	$29.75	$29.75	$42.75
Heavy melt'g steel, Phila.	24.50	24.50	24.00	45.00
Heavy melt'g steel, Ch'go	25.50	25.50	28.50	41.75
No. 1 hy. comp. sh't Det.	19.50	19.50	23.50	38.00
Low phos. Young'n	31.75	31.75	31.75	47.75
No. 1, cast, Pittsburgh	39.50	39.50	39.50	70.00
No. 1, cast, Philadelphia	35.50	35.50	39.00	65.50
No. 1, cast, Chicago	42.00	40.50	42.50	69.50
Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$15.00
Foundry coke, prompt	15.75	15.75	15.75	17.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	17.625	17.625	17.625	23.50
Copper, Lake Conn.	17.75	17.75	17.75	23.625
Tin Straits, New York	*95.75*	96.00	$1.03	$1.03
Zinc, East St. Louis	9.25	9.25	10.00	15.00
Lead, St. Louis	*12.80*	13.60	14.925	19.30
Aluminum, virgin	17.00	17.00	17.00	17.00
Nickel electrolytic	42.97	42.97	42.93	42.90
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	32.00	32.00	38.50	35.00

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Oct. 18, 1949	3.705¢ per lb.	$45.88 per gross ton	*$26.50* per gross ton
One week ago	3.705¢ per lb.	45.88 per gross ton	26.58 per gross ton
One month ago	3.705¢ per lb.	45.88 per gross ton	27.42 per gross ton
One year ago	3.720¢ per lb.	46.91 per gross ton	43.16 per gross ton

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1949	3.720¢ Jan. 1	3.705¢ May 3	$46.82 Jan. 4	$45.88 Sept. 6	$43.00 Jan. 1	$19.33 June 2
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar.
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 2
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan.
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 2
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 2
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 1
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr.
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 1
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 2
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 2
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan.
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 2
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec.

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Fifty years of service

1899—1949

SCHIAVONE · BONOMO CORP.

FOOT OF JERSEY AVE., JERSEY CITY, N. J., U. S. A. · Cable Address "SCHIABO" NEW YORK

HARRISON, N. J. · NEWARK, N. J. · BROOKLYN, N. Y. · BRONX, N. Y. · STAMFORD, CONN.

STEEL PRICES

Smaller numbers indicate producing companies. See key on facing page.

Base prices at producing points apply to the sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh, Weirton	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown	Warren	Detroit	Johnstown	Seattle, S. Fr'isco, Los Angeles	Fontana
INGOTS Carbon forging, net ton	$50.00 1											$50.00 31			
Alloy, net ton	$51.00 1.17							Houston $59.00[33]				$51.00 31			
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$52.00 1	$52.00 1	$52.00 1		$52.00 11	$52.00 3	$52.00 13	Conshohocken $57.00[26]					$52.00 3		$71.00 19
Carbon forging billets, net ton	$61.00 1	$61.00 1.4	$61.00 1.8	$61.00 4	$61.00 11	$61.00 3.4	Geneva $61.00[16] Houston $69.00[33] Conshohocken $63.00[26]				$61.00 25	$61.00 31	$61.00 3		$80.00 19
Alloy, net ton	$63.00 1.17	$63.00 1.4	$63.00 1	Conshohocken $65.00[26]		$63.00 3.4	$63.00 13	Bethlehem,[3] Canton,[4,42] Massillon[4] = $63.00			Houston $71.00[33]	$63.00 31	$63.00 3		$82.00 19
PIPE SKELP	3.25 1.5						3.25 1.4				3.25 4				
WIRE RODS	3.40 2.18	3.40 2.4.33	3.40	3.40 2	3.40 4.11		3.40 8	3.50 3	Portsmouth 3.40[20] Houston, 3.95[33]		Worcester 3.70[2]		3.40 3	4.05[24] S.F. L.A. 4.20[62] L.A.	
SHEETS Hot-rolled (18 ga. & hvr.)	3.25 1.5.9.15	3.25 23	3.25 1.6.8	3.25 4.5	3.25 4.11	3.25 3	3.25 1.6.13	3.25 3	Kokomo,[30] Ashland[7] = 3.25		3.25 4	3.45 12	Consh. 3.35[26]	3.95 24 L.A.	4.15 19
Cold-rolled	4.00[1.5] 7.9.15.63		4.00 1.6.8	4.00 4.5	4.00 11	4.00 3	4.00 6	4.00 3	4.20	4.00 7	4.00 4	4.20 12		4.95 24 S.F.	4.90 19
Galvanized (10 gage)	4.40 1.9.15		4.40 1.8		4.40 4.11		Niles 4.40[64]	4.40 3	Canton 4.40[4]		Ashland 4.40[7]			5.15 24 S.F., L.A.	
Enameling (12 gage)	4.40 1		4.40 1.8	4.40 4			4.40 6		4.60 22	4.40 7		4.70 12			
Long ternes (10 gage)	4.80 9.15		4.80 1							4.80 7					
Hi Str. Low Alloy, h.r.	4.95 1.5.9	4.95 1	4.95 1.6.8	4.95 4.5	4.95 11	4.95 3	4.95 1.6.13	4.95 3	Conshohocken 4.95[26]		4.95 4	5.15 12			
Hi Str. Low Alloy, c.r.	6.05 1.5		6.05 1.6.8	6.05 4.5		6.05 3	6.05 6.13	6.05 3			6.05 4	6.25 12			
Hi Str, Low Alloy, galv.	6.75 1			6.75 4				6.75 3	Canton 6.75[4]						
STRIP Hot-rolled	3.25 5.7.9.28	3.25 23.66	3.25 1.6.8	3.25 5	3.25 11	3.25 3	3.25 1.6.13	3.25 3	Ashland 3.25[7]	Houston 3.65[33]	3.25 4	3.45 12.47	Atlanta 3.40[65]	4.00[62] S.F., L.A. 4.25[62] S.	4.40 19
Cold-rolled	4.00 5.7.9.63	4.15 66	4.00 8	4.00 2.5		4.00 3	4.00 6.13. 40.45	4.00 3	New Haven 4.50[2,68]	4.00 7	4.00[4,49] 4.25[49]	4.20 12,47 4.25[63,81]			4.90 19
Hi Str. Low Alloy, h.r.	4.95 5		4.95 1.6.8	4.95 5	4.95 11	4.95 3	4.95 1.6.13	4.95 3			4.95 4	5.15 12			
Hi Str. Low Alloy, c.r.	6.05 5.9			6.05 2.5		6.05 3	6.05 6.13	6.05			6.05 4	6.25 12		4.00[24,62] S.F., L.A. 4.25[62] S.	6.95 19
TINPLATE† Cokes, 1.50 lb. base box	$7.75 1.5.9.15		$7.75 1.6.5		$7.85 11			$7.85 3	$7.95 23		7.75 4			8.50 24 S.F.	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct $1.30, $1.05 and 75¢ respectively from 1.50 lb. coke base box price														
BLACKPLATE, 29 ga. Hollowware enameling	5.30 1.5.13		5.30 1.6.8					5.40 3	5.50 23		5.30 4				
BARS Carbon Steel	3.35 1.5.9.17	3.35 1.4.23	3.35 1.6.8	3.35 4	3.35 4.11	3.35 3.4	3.35 1.4.6	3.35 3	Atlanta 3.50[65]	Canton 3.35[4]	Houston 3.75[33]	3.55 12	3.35 3	4.05[62] L.A. 4.05[24] S.F., L.A.	4.00 19
Reinforcing††	3.35 1.5	3.35 4	3.35 1.6.8	3.35 4	3.35 4.11	3.35 3.4	3.35 1.4.6	3.35 3	Atlanta 3.50[65]	Canton 3.35[4]	Houston 3.75[33]		3.35 3	4.10[62] S., S.F.	4.00 19
Cold-finished	3.95[5] 4.00[2,4] 17.62.69.71	4.00 3.23.69. 70	4.00 4.73.74	4.00 2.61		4.00 70	4.00 6.40.67		Putnam, Newark = 4.40[69] Cumberland = 3.95[72] Massillon,[62] Canton[4] = 4.00			4.30 12			
Alloy, hot-rolled	3.75 1.17	3.75 1.4.23	3.75 1.6.8			3.75 3.4	3.75 1.6	Bethlehem,[3] Canton,[4,42] Massillon[4] = 3.75			3.75 25	4.05 12	3.75 3	4.80 62 L.A.	4.75 19
Alloy cold-drawn	4.65 2.17.62.69.71	4.65 2.23. 69.70	4.65 4.73.74	4.65 2.61		4.65 3.70	4.65 6.67	Bethlehem,[3] Massillon 4.62 = 4.65			4.65 25	Canton = 4.65[4,42] Newark,[69] Worcester[2] = 4.95			
Hi Str. Low Alloy, h.r.	5.10 1.5		5.10 1.6.8	5.10 4	5.10 11	5.10 3	5.10 1.6	Bethlehem = 5.10[3]				5.30 12	5.10 3		
PLATE Carbon steel	3.40 1.5	3.40 1	3.40 1.6.8	3.40 4	3.40[4,11] Houston = 3.80[33] Conshohocken = 3.50[26]	3.40[31]	3.40[13]	3.40[3]	Coatesville = 3.50[21] Claymont = 3.50[39] Geneva = 3.40[16] Harrisburg = 3.75[35]			3.65 12	3.40 3	4.30 62 S.	4.00 19
Floor plates	4.55 1	4.55 1	4.55 8	4.55 5				Conshohocken,[26] Harrisburg[35] = 4.55							
Alloy	4.40 1	4.40 1	4.40 1	Conshohocken = 4.40[26]			4.40 13	4.40 3	Coatesville = 4.50[21]				4.40 3		
Hi Str. Low Alloy	5.20 1.5	5.20 1	5.20 1.8	5.10 4.5	5.20 11		5.20 6	5.20 3	Conshohocken = 5.20[26] Geneva = 5.20[16]			5.45 12	5.20 3		
SHAPES, Structural	3.25 1.5.9	3.25 1.23	3.25 1.6.8		3.25 11	3.30 3	Bethlehem = 3.30,[3] Geneva = 3.25[16] Minnequa, Colo. = 3.75[14], Houston = 3.65[33]						3.30 3	3.80[62] S.F. 3.85[33] L.A.	3.80 19
Hi Str. Low Alloy	4.95 1.5	4.95 1	4.95 1.6.8		4.95 11	5.05 3	4.95 6		Bethlehem = 5.05[3]				5.05 3	3.90[62] S. 3.95[24] L.A.	
MANUFACTURERS' WIRE Bright	4.15 2.5.18	4.15[4,33] 2.34		4.15 2.77	4.15 4.11	Portsmouth 4.15[20]	4.15 6	4.25 3		Duluth = 4.15[2] Worcester = 4.45[2] Pueblo = 4.50[14]			4.15 3	5.10[24] S.F. 5.10[62] L.A. 5.10[24] L.A.	
PILING, Steel sheet	4.05 1.9	4.05 1				4.05 3									

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	12.75	13.50	15.00	14.50	22.75	18.25	20.00	11.25	13.75	11.50
Slabs, billets, rerolling	17.00	18.25	20.25	19.25	30.25	24.50	26.75	15.00	18.50	15.25
Forg. discs, die blocks, rings	30.50	30.50	33.00	32.00	49.00	38.50	41.00	24.50	25.00	25.00
Billets, forging	24.25	24.25	26.25	25.50	39.00	29.00	32.75	19.50	20.00	20.00
Bars, wire, structurals	28.50	28.50	31.00	30.00	46.00	34.00	38.50	23.00	23.50	23.50
Plates	32.00	32.00	34.00	34.00	50.50	39.50	44.00	26.00	26.50 27.00	26.50
Sheets	37.50	37.50	39.50	39.50	53.00	45.50	50.00	33.00	33.50	35.50
Strip, hot-rolled	24.25	25.75	30.00	27.75	46.00	34.50	38.75	21.25	28.00	21.75
Strip, cold-rolled	30.50	33.00	36.50	35.00	55.00	44.50	48.50	27.00	33.50	27.50

Numbers correspond to producers. See Key below.

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38, 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38; W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 49; Youngstown, 48; Lockport, N. Y., 46; New Britain, Conn., 58; Sharon, 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1, 67; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill. 2; Lockport, N. Y., 46; Canton, Ohio, 42.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Chicago, 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28; Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks and rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa, 17; Baltimore, 7; Washington, Pa., 39; Mckeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago 1.

KEY TO STEEL PRODUCERS

With Home Offices

1 Carnegie-Illinois Steel Corp., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Armco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R.R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Co., Inc., Oakland, Calif.
20 Portsmouth Steel Corp., Portsmouth, Ohio
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Midvale Co., Philadelphia
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Iron & Steel Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 American Chain & Cable Co., Inc., New York
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 A. M. Byers Co., Pittsburgh
54 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
55 Ingersoll Steel Div., Chicago
56 Latrobe Electric Steel Co., Latrobe, Pa.
57 Fitzsimons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 Vanadium-Alloys Steel Co., Latrobe, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Francisco
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wyckoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Indianapolis
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forgings Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City

Notes to Steel Price Table:

†Special coated mfg ternes, deduct $1.10 from 1.50-lb coke base box price. Canmaking quality blackplate, 55 to 128-lb, deduct $2.00 from 1.50-lb coke base box.

‡Straight lengths only from producer to fabricator.

PIPE AND TUBING

Base discounts, f.o.b. mills
Base price, about $200.00 per net ton

Standard, Threaded and Coupled

Steel, buttweld*	Black	Galv
⅛-in.	43 to 41	26½ to 24½
¼-in.	46 to 44	30½ to 28½
⅜-in.	48½ to 46½	33½ to 31½
½-in.	49 to 47	34 to 32
¾-in.	49½ to 47½	34½ to 32½
1-in.	50 to 48	35 to 33
1¼ to 3-in.	50½ to 48½	35½ to 33½

Steel, lapweld		
2-in.	39½	26 to 24
2½ to 3-in.	43½ to 42½	28 to 27
3½ to 6-in.	46½ to 42½	31 to 27

Steel, seamless		
2-in.	38½	23
2½ to 3-in.	41½	26
3½ to 6-in.	43½	28

Wrought Iron, buttweld		
⅛-in.	+20½	+47
¼-in.	+10½	+36
⅜ & ½ in.	+ 4½	+27
¾-in.	— 1½	+23½
1-in.	— 2	+23

Wrought Iron, lapweld		
2-in.	+ 7½	+31
2½ to 3½-in.	+ 5	+26½
4-in.	list	+20½
4½ to 8-in.	+ 2	+22

Extra Strong, Plain Ends

Steel, buttweld		
⅛-in.	42 to 40	27 to 25
¼-in.	46 to 44	31 to 29
⅜-in.	48 to 46	34 to 32
½-in.	48½ to 46½	34½ to 32½
¾-in.	49 to 47	35 to 33
1-in.	49½ to 47½	35½ to 34½
1¼ to 3-in.	50 to 48	36 to 34

Steel, lapweld		
2-in.	39½ to 38½	25 to 24
2½ to 3-in.	44½ to 42½	30 to 28
3½ to 6-in.	48 to 44	33½ to 31½

Steel, seamless		
2-in.	37½	23
2½ to 3-in.	41½	27
3½ to 6-in.	45	30½

Wrought Iron, buttweld		
⅛-in.	+16	+40
¼-in.	+ 9½	+34
⅜ to 2-in.	— 1½	+23

Wrought Iron, lapweld		
2-in.	+ 4½	+27½
2½ to 4-in.	— 5	+16
4½ to 6-in.	— 1	+20½

For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct.

*Fontana, Calif., deduct 11 points from figures in left columns.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD in.	Gage BWG	Seamless H.R.	Seamless C.R.	Electric Weld H.R.	Electric Weld C.D.
2	13	$19.18	$22.56	$18.60	$21.89
2½	12	25.79	30.33	25.02	29.41
3	12	28.68	33.76	27.82	32.74
3½	11	35.85	42.20	34.78	40.94
4	10	44.51	52.35	43.17	50.78

CAST IRON WATER PIPE

Per net ton

6 to 24-in., del'd Chicago	$95.70
6 to 24-in., del'd N. Y.	$92.50 to 97.40
6 to 24-in., Birmingham	82.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	109.30

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails*	103	122
Woven wire fence†	109	132
Fence posts, carloads††	112	...
Single loop bale ties	106	130
Galvanized barbed wire**	123	143
Twisted barbless wire	123	...

* Pgh., Chi., Duluth; Worcester, 6 columns higher; Houston, 8 columns higher; Kansas City, 12 Columns higher. † 15½ gage and heavier. ** On 80 rod spools, in carloads. †† Duluth, Joliet and Johnstown.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire‡	$4.80	$5.75
Annealed, galv. fencing‡	5.25	6.20
Cut nails, carloads‡‡	6.75	...

‡ Add 30¢ at Worcester; 10¢ at Sparrows Pt.

‡‡ Less 20¢ to jobbers.

PRODUCING POINTS — *Standard, coated or galvanized nails, woven wire fence, bale ties, and barbed wire:* Alabama City, Ala., 4; Atlanta, 65; Aliquippa, Pa. (except bale ties), 5; Bartonville, Ill. (except bale ties), 34; Chicago, 4; Donora, Pa., 2; Duluth, 2; Fairfield, Ala., 11; Johnstown, Pa. (except bale ties), 3; Joliet, Ill., 2; Kokomo, Ind., 30; Minnequa, Colo., 14; Monessen, Pa. (except bale ties), 18; Pittsburg, Calif., 24; Portsmouth, Ohio, 20; Rankin, Pa. (except bale ties), 2; Sparrows Point (except woven fence), 3; Sterling, Ill., 33; San Francisco (except nails and woven fence), 14; Torrance, Calif. (nails only), 24; Worcester (nails only), 2; Houston (except bale ties), 83; Kansas City (except bale ties), 83.

Fence posts: Duluth, 2; Johnstown, Pa., 3; Joliet, Ill., 2; Minnequa, Colo., 14; Moline, Ill., 4; Williamsport, Pa., 51.

Cut nails: Wheeling, W. Va., 15; Conshohocken, Pa., 26.

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct,		
Coatesville, Pa. (21)	*26.50	
Washgtn, Pa. (39)	*26.50	
Claymont, Del. (29)	*26.50	
Conshohocken, Pa. (26)		*22.50
New Castle, Ind. (55)	*26.50	*24.00
Nickel-carbon		
10 pct, Coatesville, (26)	27.50	
Inconel-carbon		
10 pct, Coatesville, (21)	36.00	
Monel-carbon		
10 pct, Coatesville, (21)	29.00	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (41)		75.00
Aluminized steel sheets, hot dip, Butler, Pa., (7)		7.75

* Includes annealing and pickling, or sandblasting.

ELECTRICAL SHEETS

24 gage, HR cut lengths, f.o.b. mill

	Cents per lb
Armature	5.45
Electrical	5.95
Motor	6.70
Dynamo	7.50
Transformer 72	8.05
Transformer 65	8.60
Transformer 58	9.30
Transformer 52	10.10

PRODUCING POINTS—Beech Bottom, W. Va., 18; Brackenridge, Pa., 28; Follansbee, W. Va., 63; Granite City, Ill., 22; Indiana Harbor, Ind., 8; Mansfield, Ohio, 75; Niles, Ohio, 64, 76; Toronto, Ohio, 63; Vandergrift, Pa. 1; Warren, Ohio, 4; Zanesville, Ohio, 7.

Numbers after producing points correspond to steel producers. See key on previous page.

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
½ in. & smaller x 6 in. & shorter	35
9/16 & ⅝ in. x 6 in. & shorter	37
¾ in. & larger x 6 in. shorter	34
All diam., longer than 6 in.	30
Lag, all diam over 6 in. & longer	35
Lag, all diam x 6 in. & shorter	37
Plow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	35
9/16 to 1 in. inclusive	34
1⅛ to 1½ in. inclusive	32
1⅝ in. and larger	27

On above bolts and nuts, excepting plow bolts, additional allowances of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	..	41
½ in. and smaller	38	..
⅝ in. through 1 in.	..	39
9/16 in. through 1 in.	37	..
1⅛ in. through 1½ in.	35	37
1⅝ in. and larger	28	..

In full case lots, 15 pct additional discount.

Stove Bolts

Packages, nuts separate	$61.75
In bulk	70.00

Large Rivets

(½ in. and larger)

	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

(7/16 in. and smaller)

	Pct off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46
¾ to 1 in. x 6 in., SAE (1035), heat treated	35
Milled studs	19
Flat head cap screws, listed sizes	5
Fillister head cap, listed sizes	28

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	4.00¢
0.41 to 0.60 carbon	5.50¢
0.61 to 0.80 carbon	6.10¢
0.81 to 1.05 carbon	8.05¢
1.06 to 1.35 carbon	10.35¢

Worcester, add 0.30¢.

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb	$3.21
Joint bars, per 100 lb	4.25
Light rails per 100 lb	3.55

	Base Price cents per lb
Track spikes	5.35
Axles	5.20
Screw spikes	8.00
Tie plates	4.05
Tie plates, Pittsburgh, Torr., Calif.*	4.20
Track bolts, untreated	8.25
Track bolts, heat treated, to railroads	8.50

*Seattle, add 30¢.

PRODUCING POINTS—*Standard rails:* Bessemer, Pa., 1; Ensley, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Minnequa, Colo., 14; Steelton, Pa., 3.

Light rails: All the above except Indiana Harbor and Steelton, plus Fairfield, Ala., 11; Johnstown, Pa. 3; Minnequa, Colo., 14.

Joint bars: Bessemer, Pa., 1; Fairfield, Ala., 11; Indiana Harbor, Ind., 8; Joliet, Ill., 1; Lackawanna, N. Y., 3; Steelton, Pa., 3; Minnequa, Colo., 14.

Track spikes: Fairfield, Ala., 11; Indiana Harbor, Ind., 6, 8; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 5; Chicago, 4; Struthers, Ohio, 6; Youngstown, 4.

Track bolts: Fairfield, Ala., 11; Lebanon, Pa., 3; Minnequa, Colo., 14; Pittsburgh, 77, 78.

Axles: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 79; Johnstown, Pa., 3; McKees Rocks, Pa., 1.

Tie plates: Fairfield, Ala., 11; Gary, 1; Indiana Harbor, Ind., 8; Lackawanna, N. Y., 3; Pittsburg, Calif., 24; Pittsburgh, 4; Seattle, 62; Steelton, Pa., 3; Torrance, Calif., 24; Minnequa, Colo., 14.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	$1.42
18	4	2	—	—	$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢

High-carbon-chromium	52¢
Oil hardened manganese	39¢
Special carbon	26.5¢
Extra carbon	22¢
Regular carbon	19¢

Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$15.50 to $16.00
Foundry, oven coke	
Buffalo, del'd	$20.90
Chicago, f.o.b.	20.40
Detroit, f.o.b.	19.40
New England, del'd	22.70
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	20.45
Swedeland, Pa., f.o.b.	20.40
Plainesville, Ohio, f.o.b.	20.90
Erie, del'd	$20.25 to 21.04
Cleveland, del'd	22.62
Cincinnati, del'd	21.71
St. Paul, f.o.b.	22.50
St. Louis, del'd.	21.60
Birmingham, del'd	18.75

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net: Effective CaF, content:

70% or more	$37.00
60% or less	34.00

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, dollars per 100 lb. (Metropolitan area delivery, add 15c to base price except Cincinnati and New Orleans (*), add 10c; New York, Chicago and Boston, add 20c.)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Baltimore	5.31	6.21-6.41	6.95-7.11	5.37	....	5.56	5.36	5.42	6.18	....	9.60-10.10	....	....
Birmingham	4.85	5.75	6.15	4.85	....	5.10	4.90	4.90	6.59	....	....	....	....
Boston	5.55	6.45-6.75	7.11-7.61	5.60	6.75	5.75	5.42	5.52	6.02	9.36-9.67	9.67-9.87	10.72	11.02
Buffalo	4.85	5.75	7.42-7.57	5.24	7.27	5.35	5.00	4.95	5.40	9.30	9.60	10.65	10.95
Chicago	4.85	5.75	6.85	4.85	5.45-6.15	5.10	4.90	4.90	5.40	8.90	9.20	10.25	10.55
Cincinnati*	5.16-5.51	5.84-6.28	6.59-6.93	5.28-5.43	....	5.53-5.85	5.33	5.33-5.48	6.08-6.20	9.74	9.98	11.19	11.44
Cleveland	4.85	5.75	6.70	5.03	....	5.21	5.01	5.01	5.46	9.05	9.35	10.40	10.70
Detroit	5.28-5.32	6.07-6.18	7.38-7.58	5.27-5.47	6.27-6.58	5.52-5.57	5.33-5.40	5.33-5.55	6.00-6.18	9.67	9.92	11.11	11.35
Houston	6.70-6.95	....	7.30	6.70	....	6.70	6.20-6.70	6.40-6.85	7.09	10.45	10.40	11.45	11.70
Indianapolis	5.29	6.13	7.44	5.29	7.38	5.54	5.34	5.34	6.14	11.25	11.38	....	....
Kansas City	5.50	6.40	7.50	5.50	6.95[5]	5.75	5.55	5.55	6.10	9.55	9.85	10.90	11.20
Los Angeles	5.45	7.00	7.45	5.95	7.35[39]	5.50	5.45	5.60	7.25	....	....	....	....
Memphis	5.75-5.80	6.80	7.20	5.80-5.95	6.89	5.95-6.00	5.75	5.75	6.53	....	....	....	....
Milwaukee	5.03	5.93	7.02	5.03-5.38	6.32	5.28	5.08	5.08	5.63	9.08	9.38	10.43	10.73
New Orleans*	5.95	6.75	....	6.15	....	6.15	5.95	5.95	6.65[8]	....	....	....	....
New York	5.40	6.31	6.85-6.90	5.62	6.76	5.65	5.33	5.57	6.31	9.28	9.58	10.63	10.93
Norfolk	6.00	....	....	6.20	....	6.05	6.05	6.05	7.05	....	....	....	....
Omaha	6.13	....	8.33	6.13	....	6.38	6.18	6.18	6.98	....	....	....	....
Philadelphia	4.95	6.24[13]	6.63	5.40	6.29	5.35	5.10	5.40	5.98	9.05	9.35	10.82	10.87
Pittsburgh	4.85	5.75	6.90	5.00	6.00	5.05	4.90	4.90	5.40	8.90	9.20	10.25	10.55
Portland	6.50[8]-7.05	8.00	8.80-9.10	6.85[8]	....	6.30[8]	6.35[8]	6.35[8]	8.25[14]	10.50[6]	10.10[6]	....	....
Salt Lake City	7.05	7.05	8.65	7.45[3]	....	5.65[3]	5.50[3]	7.10[3]	8.15	....	....	....	....
San Francisco	6.15[8]	7.50[2]	8.65-7.80	6.75[8]	8.25[5]	6.35[8]	5.90[8]	5.90[8]	7.55	9.80	10.00	11.20	11.60
Seattle	6.70[4]-7.10	8.15[2]-8.65	8.80-9.30	6.70[4]	....	6.35[4]	6.30[4]	6.20[4]	8.15[14]	....	10.35[15]	....	13.10[15]
St. Louis	5.22-5.37	6.12-6.27	7.32	5.22	6.69-7.54	5.47	5.27	5.27	5.82	9.27-9.72	9.57-9.97	10.82-11.17	10.92-11.42
St. Paul	5.44	6.19-6.34	7.54-7.64	5.44	6.82	5.64-6.69	5.49	5.49	6.84	9.49	9.79	10.84	11.14

BASE QUANTITIES *Standard unless otherwise keyed on prices.*

Hot-Rolled: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

Cold-Rolled: Sheets, 400 to 1499 lb strip, extras on all quantities. Bars 1000 lb and over.

Alloy Bars: 1000 to 1999 lb.

Galvanized Sheets: 450 to 1499 lb.

Exceptions:
(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb; (18) 1000 to 1499 lb; (19) 1500 to 3499 lb; (20) 6000 lb and over.

PIG IRON PRICES

Dollars per gross ton. Delivered prices do not include 3 pct tax on freight.

PRODUCING POINT PRICES

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00	48.50	49.00	49.50	.....
Birmingham	38.88	39.38	.....	.....	.....
Buffalo	46.00	46.50	47.00	.....	.....
Chicago	46.00	46.50	46.50	47.00	.....
Cleveland	46.00	46.50	46.50	47.00	51.00
Duluth	46.00	46.50	46.50	47.00	.....
Erie	46.00	46.50	46.50	47.00	.....
Everett	.....	50.50	51.00	.....	.....
Granite City	47.90	48.40	48.90	.....	.....
Ironton, Utah	46.00	46.50	.....	.....	.....
Lone Star, Texas	46.00	46.50†	.....	.....	.....
Pittsburgh	46.00	46.50	46.50	47.00	.....
Geneva, Utah	46.00	46.50	.....	.....	.....
Sharpsville	46.00	46.50	46.50	47.00	.....
Steelton	48.00	48.50	49.00	49.50	54.00
Struthers, Ohio	46.00	.....	.....	.....	.....
Swedeland	48.00	48.50	49.00	49.50	.....
Toledo	46.00	46.50	46.50	47.00	.....
Troy, N. Y.	48.00	48.50	49.00	.....	54.00
Youngstown	46.00	46.50	46.50	47.00	.....

DELIVERED PRICES (BASE GRADES)

Consuming Point	Producing Point	Rail Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$0.50 Arb.	.....	50.50	51.00	.....	.....
Boston	Steelton	6.90	.....	.....	.....	.....	60.90
Brooklyn	Bethlehem	4.29	.....	52.79	53.29	53.79	.....
Cincinnati	Birmingham	6.70	45.58	46.08	.....	.....	.....
Jersey City	Bethlehem	2.63	.....	51.13	51.63	52.13	.....
Los Angeles	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Mansfield	Cleveland-Toledo	3.33	49.33	49.83	49.83	50.33	54.33
Philadelphia	Bethlehem	2.39	50.39	50.89	51.39	51.89	.....
Philadelphia	Swedeland	1.44	49.44	49.94	50.44	50.94	.....
Philadelphia	Steelton	3.09	.....	.....	.....	.....	57.09
Rochester	Buffalo	2.63	48.63	49.13	49.63	.....	.....
San Francisco	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
Seattle	Geneva-Ironton	7.70	53.70	54.20	.....	.....	.....
St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65	.....	.....
Syracuse	Buffalo	3.58	49.58	50.08	50.58	.....	.....
Gulf Ports	Lone Star, Texas	.....	50.50	51.00†	.....	.....	.....

† Low Phos., Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50c per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct for foundry iron); phosphorus differentials, a reduction of 38c per ton for phosphorus content of 0.70 pct and over manganese differentials, a charge not to exceed 50c per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.01 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio—$59.50; f.o.b. Buffalo, $60.75. Add $1.00 per ton for each additional 0.50 pct $1 up to 17 pct. Add 50c per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus $60.00 per gross ton, f.o.b. Lyle, Tenn. Delivered Chicago, $68.56. High phosphorus charcoal pig iron is not being produced.

FERROALLOYS

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.

F.o.b. Birmingham	$174
F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont.	$172
F.o.b. Johnstown, Pa.	$174
F.o.b. Sheridan, Pa.	$172
F.o.b. Etna, Clairton, Pa.	$175

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.45
Ton lots	12.05
Less ton lots	12.95

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$64.00	$65.00
Pgh. or Chicago	65.00	66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	35.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	25.25	27.10	28.30
0.10% max. C	24.75	26.60	27.80
0.15% max. C	24.25	26.10	27.30
0.30% max. C	23.75	25.60	26.80
0.50% max. C	23.25	25.10	26.30
0.75% max. C, 7.00% max. Si	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	8.95
Ton lots	10.60
Briquet, contract basis carlots, bulk delivered, per lb of briquet	10.30
Ton lots	11.90
Less ton lots	12.80

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $77.00 gross ton, freight allowed to normal trade area; Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $73.50. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.

25% Si	17.00
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)

0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35

Briquets — Contract price, cents per pound of briquet, delivered, 60% chromium.

Carload bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, per lb chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% max. C	$1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis.. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.00¢
Ton lots to carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	7.40¢
Ton lots	8.80¢
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	$1.10
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.28
Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads per net ton	$160.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Molybdenum oxide briquets, f.o.b. Langeloth, Pa.; bags, f.o.b. Wash., Pa., per lb contained Mo.	95¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk, lump	11.00¢
Ton lots, bulk, lump	11.50¢
Ton lots, packed, lump	11.75¢
Less ton lots, lump	12.25¢
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.20
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
Carload, bulk	6.60¢

Boron Agents

Contract prices, per lb of alloy, del.

Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$4.25
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y.: freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots	$1.20
F.o.b. Wash., Pa.; 100 lb and over	
10 to 14% B.	.75
14 to 19% B.	1.20
19% min. B.	1.50
Grainal, f.o.b. Bridgeville, Pa. freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered	
Ton lots	45.00¢

IMPORTED ORES

Beryllium Ore

Imported ore, 10 to 12% BeO, $25 to $27 per short ton unit, c.i.f. U. S. ports.

Chrome Ore

Imported ore, per gross ton, dry basis, subject to penalties if guarantees are not met, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Ore., and/or Tacoma, Wash.

Indian and African	
48% Cr_2O_3, 3 to 1 ratio	$39.00
48% Cr_2O_3, 2.8 to 1 ratio	37.50
48% Cr_2O_3, no ratio	31.00
Philippine Islands	
48% Cr_2O_3, 3 to 1 ratio	$39.00 to 41.00
Rhodesian	
48% Cr_2O_3, 3 to 1 ratio	$39.00
48% Cr_2O_3, no ratio	30.00
45% Cr_2O_3, no ratio	$27.00 to 27.50
South African (Transvaal)	
50% Cr_2O_3, no ratio	$29.50 to 30.50
48% Cr_2O_3, no ratio	29.00 to 30.00
45% Cr_2O_3, no ratio	26.50
44% Cr_2O_3, no ratio	25.50 to 26.00
Turkish	
48% Cr_2O_3, 3 to 1 ratio	$39.00 to 41.00
Domestic	
48% Cr_2O_3, 3 to 1 ratio, f.o.b. nearest shipping point	$39.00

Manganese Ore

On long-term contracts involving large tonnages prices are nominal and subject to other factors of negotiation. Nearby business, basis 48% Mn, duty paid, 81.8¢ to 83.8¢ per long ton unit, c.i.f. U. S. ports. Prices on lower grade ore is adjusted to the Mn content and may be subject to penalties according to the content of impurities.

Titanium Ore

Imported ore, ilmenite, 56 to 59% TiO_2, c.i.f. Atlantic seaboard, $16 to $18 per gross ton, according to grade and impurities. Rutile, granular form, per lb, guaranteed minimum 94 to 96% concentrate, $90 to $100 per short ton, c.i.f. carload lots, Atlantic seaboard.

Note — Prices on many foreign ores show fluctuations that are dependent on quality, quantity, commissions, delivery and other factors of negotiation. Quotations are considered representative, but may be subject to penalties or premiums, according to the content of impurities, etc.

Short ton unit equals 20.0 lb.

Long ton unit equals 22.4 lb.

Ore prices per ton are calculated by multiplying the price per unit of contained metal by the number of units per ton. The number of units per ton is the percentage figure.

LAKE SUPERIOR ORES

(51.50% Fe; natural content, delivered lower lake ports)

	Per gross ton
Old range, bessemer	$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20

REFRACTORIES

(F.o.b. works)

Fire Clay Brick

	Carloads, Per 1000
First quality, Pa., Ky., Mo., Ill. (except Salina, Pa., add $5)	$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	11.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	$85.00 to 95.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	$14.75 to 15.00
Silica cement, net ton, bulk, Utah and Calif.	21.00

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Chester	$69.00

Magnesite Brick

Standard, Balt. and Chester	$91.00
Chemically bonded, Balt. and Chester	80.00

Grain Magnesite

Std. ⅜-in. grains

Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	$56.00 to 56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	$30.50 to 31.00
in sacks with fines	35.00 to 35.50

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢; Missouri Valley, add 20¢.. $12.25

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	7.4¢ to 9.0¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	31.5¢ to 39.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	90.0¢ to $1.75
Aluminum	29.00¢
Antimony	45.78¢
Brass, 10 ton lots	22.75 to 25.25¢
Copper, electrolytic	27.75¢
Copper, reduced	27.625¢
Cadmium	$2.40
Chromium, electrolytic, 99% min.	$3.50
Lead	21.55¢
Manganese	55.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	61.00¢
Nickel, spherical, minus 30 mesh, unannealed	68.00¢
Silicon	34.00¢
Solder powder	8.5¢ plus metal cost
Stainless steel, 302	75.00¢
Tin	$1.08
Tungsten, 99%	$2.90
Zinc, 10 ton lots	15.50 to 18.25¢

ELECTRODES

Cents per lb. f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	18.00¢
8 to 16	48, 60, 72	18.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

New Tariff Concessions Affect Iron, Steel and Metals

Washington—Starting next Jan., 10 additional European and Latin American nations will join with the United States and 22 other nations in observing terms of reciprocal trade agreements made at Geneva in 1947 (THE IRON AGE, Dec. 18, 1947, p. 115).

Details of the Annecy meeting beginning last April were announced by the State Dept. last week. In general, they involve tariff slashes of up to 50 pct (of existing rates) on a long list of items including iron and steel, metals and minerals, and metal fabrications. Existing duties or the duty-free status of others were bound.

Concessions made automatically apply to imports from each of the other contracting nations. Concessions made by the U. S. at Annecy involve $250 million worth of imports; concessions were made to the U. S. by other countries covering $100 million worth of American exports (1948 figures for both).

The 10 countries acceding to the trade agreement at the Annecy conference are Sweden, Italy, Denmark, Dominican Republic, Finland, Greece, Haiti, Liberia, Nicaragua and Uruguay.

French Process Extrudes Steel

New York—Savings of 30 pct and more in steel fabricating costs are claimed from the new Ugine extrusion process. The new process, invented and patented by René Perrin, leading French metallurgist and executive of the Société d'Electro-Chimie, d'Electro-Metallurgie et des Acièries Eléctrique d'Ugine, Paris, is said to permit handling steel like a plastic material, extruding in a hydraulic press the most intricate forms and sections. Finished gears of alloy steel, for example, can be produced in two operations by the Ugine method.

Anaconda
NODULIZED
MANGANESE ORE

Manganese content
approximately 59%

Anaconda
FERROMANGANESE

STANDARD GRADE

ANACONDA
from mine to consumer

Anaconda's production is the principal U. S. source of supply for metallurgical grade manganese ore.

ANACONDA COPPER MINING COMPANY
Offices: 25 Broadway, New York 4, N. Y.
Anaconda, Montana

49352

Iron Age Introduces

Continued from Page 21

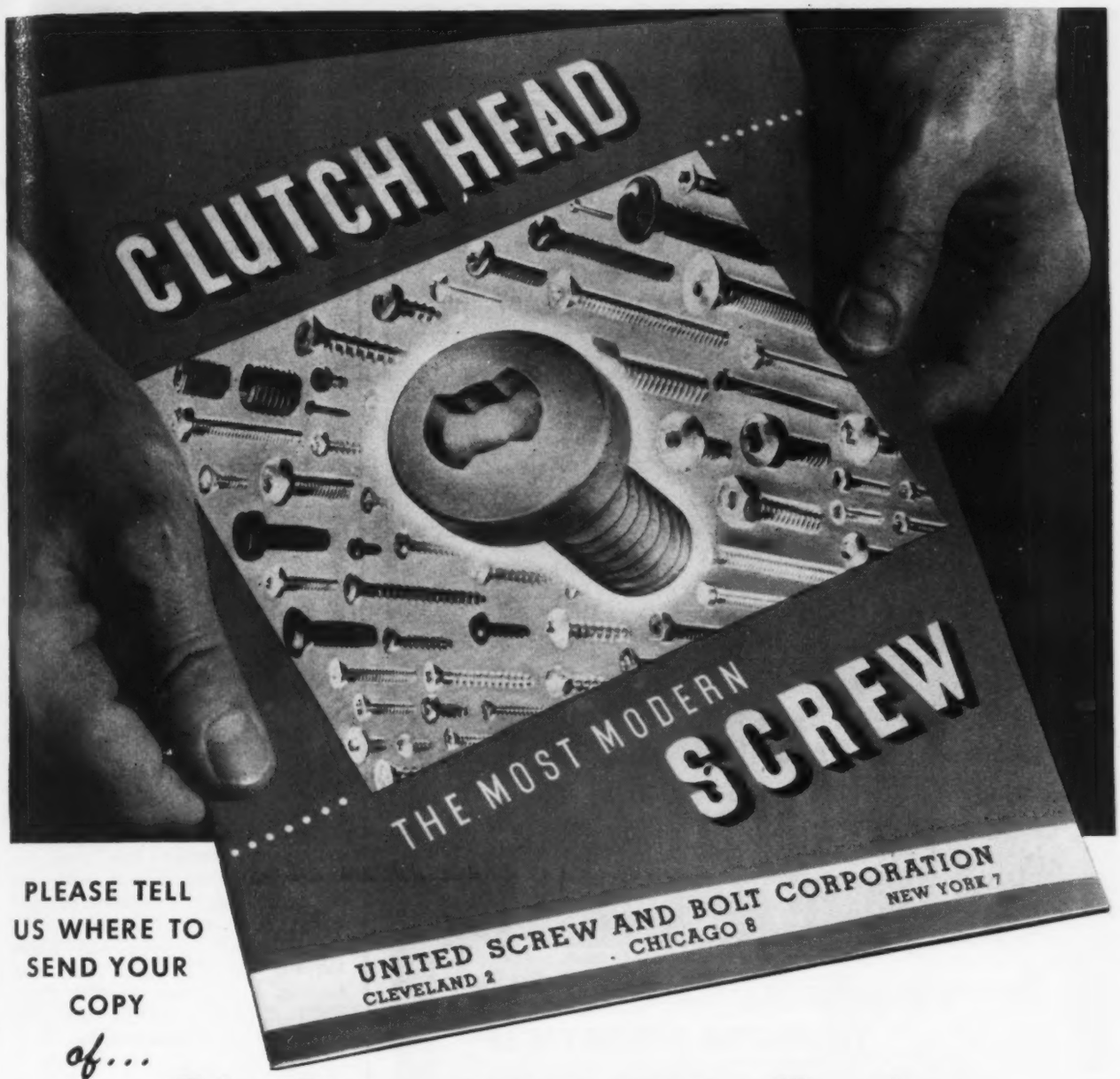
E. H. Ehlert has been appointed region manager of industrial cleaning equipment and chemical sales for midwestern states, DETREX CORP., Detroit. Mr Ehlert joined the organization in 1943 when he was connected with the field sales and service staff.

RICHARD H. BANCROFT, Executive engineer, Perfect Circle Corp.

Richard H. Bancroft has been appointed executive engineer, PERFECT CIRCLE CORP., Hagerstown, Ind. He is assuming the position left vacant by the retirement of **Macy Teetor.** Replacing Mr. Bancroft as head of the foundry is **Dallas F. Lunsford,** who was assistant manager of the plant prior to his promotion. **Robert C. Myers,** former assistant manager of the sleeve casting plant, has been named to succeed Mr. Bancroft as head of that organization.

George T. Christopher has resigned as president and general manager of PACKARD MOTOR CAR CO., Detroit. Mr. Christopher came to the company in 1934 after 16 years with General Motors Corp.

F. C. Tucker has been named purchasing manager of the chemical department, GENERAL ELECTRIC CO., Schenectady, Mr. Tucker has until recently been assistant purchasing agent with the Rohm & Hass Co. **Robert J. Baumann** has been appointed an analyst in the marketing research section of the marketing division in the company's chemical de-



PLEASE TELL US WHERE TO SEND YOUR COPY *of...*

This New CLUTCH HEAD *Brochure*

This 12-page book tells the inside story of "How and Why" CLUTCH HEAD delivers a bonus of 15% to 50% higher production with matching lowered costs.

It incorporates technical reference data your engineers will want . . . all in clear-cut easy to read tabular form.

It details and illustrates, photographically, these exclusive time-and-money-saving features . . . obtainable only with CLUTCH HEAD and not matched by any other screw on the market:

Higher Visibility of the recess, presenting an easy-to-hit target . . . even for "green" operators.

Dead-center Entry for automatic straight driving . . . preventing burring or chewing-up of heads.

The Safety of Non-tapered Driving engagement . . . eliminating "ride-out" and reducing skid damage to zero . . . also cancelling out a fatigue factor with effortless driving.

A Frictional Lock-on, joining screw and bit as a unit, to permit easy placement and one-handed driving at "fumble spots."

Unmatched Tool Economy with a Type "A" Bit so rugged that it drives up to 214,000 screws non-stop . . . and that can be REPEATEDLY reconditioned to original efficiency in 60 seconds.

Logical Basic Design of the recess for common screwdriver operation . . . vitally important to simplified field service.

United Screw and Bolt Corporation
2513 W. Cullerton St., Chicago 8

Send new CLUTCH HEAD Brochure to

Name .....

Title .....

Address .....

.....

Please attach coupon to business letterhead and mention sizes and types of screws in which you are interested.

Can your Spring Coiler make this?

WIRE FORM
with secondary operation

Crack tough production problems faster with a
TORRINGTON SPRING COILER

Torrington's W-11 Spring Coiler

Ever see a Torrington Spring Coiler go to work? The way these versatile machines tackle the toughest kind of spring assignments is *practically human!* You just can't beat 'em for *speed, accuracy* and *economy!* That's why professional springmakers everywhere turn to Torrington for quick answers to their springmaking problems. The wire form (shown above) with the secondary operation on it is typical of the exacting work you can produce with Torrington Spring Coilers. Why not write our Sales Department for the details on this particular spring job, or any special problem you may have!

The TORRINGTON
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

IRON AGE INTRODUCES

Continued

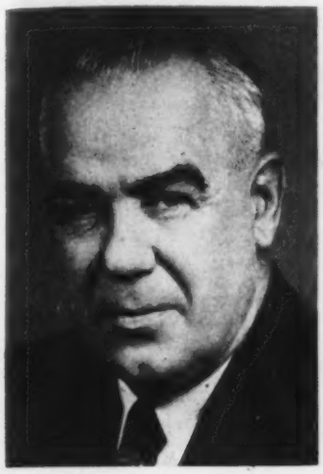
partment. **Leland T. Weller,** carboloy specialist in the apparatus department, has retired after more than a quarter of a century of service with the company.

FRANK ALEXANDER, superintendent of labor and transportation, Los Angeles Plant, Bethlehem Steel Corp.

Frank Alexander has been appointed superintendent of labor and transportation; **C. C. Brandt,** superintendent in charge of mechanical and electrical maintenance; and **Frank Farrell,** superintendent of open hearths, at the Los Angeles Plant, BETHLEHEM PACIFIC COAST STEEL CORP., Bethlehem, Pa.

Roger W. Braden, formerly manager of the Detroit warehouse, has been reassigned as manager of the New York warehouse, GENERAL REFRACTORIES CO., Philadelphia. **DeWitt C. Clement, Jr.,** has also been transferred to the New York warehouse where he will be a member of the sales force. **Alan R. Eakins** has been sent from the estimating dept. to become a member of the warehouse sales force, and **Richard H. Lightfine** has been transferred from the New York warehouse to the New York district sales office. **James S. McKelvy** has been transferred from the estimating dept. to railway sales. He is temporarily assigned to the St. Louis office. **William G. Noble** has left the estimating dept. and is now at the Philadelphia district sales office, and **Richard A. Stephens** has also been assigned to the Philadelphia district

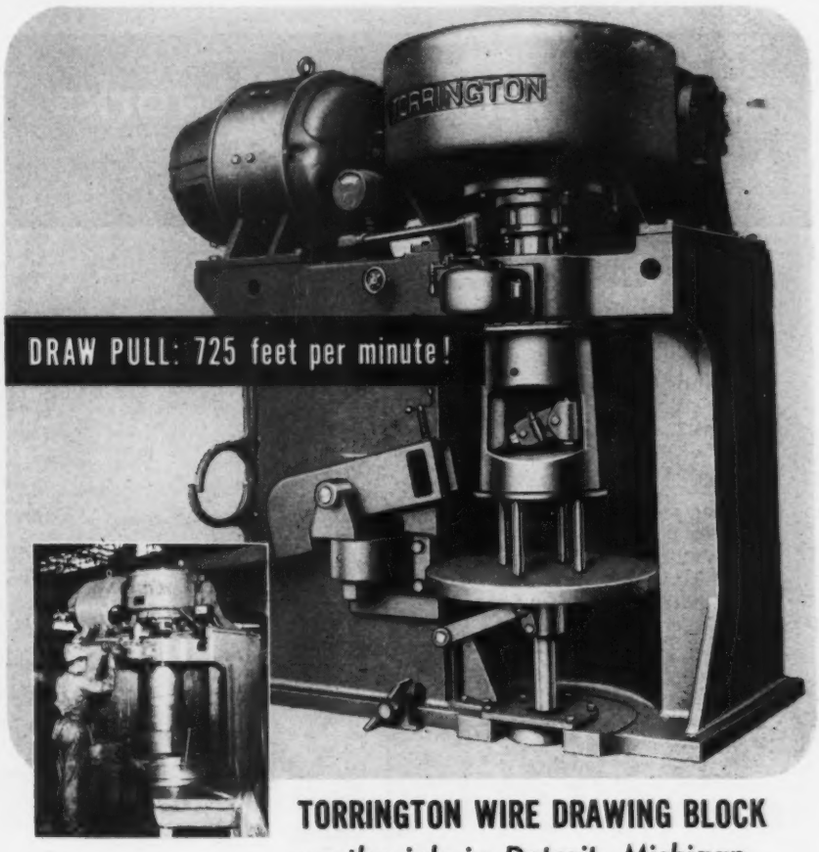
sales office. **Karl E. Spaeth, Jr.**, has been transferred from the New York warehouse to the Pittsburgh district sales office.



W. J. SCOTT, general mfg. manager, Chevrolet Motor Div., General Motors Corp.

J. C. Jamieson, former zone manager in Dallas, has been promoted to western regional manager, Pontiac Motor Div., GENERAL MOTORS CORP., New York. Chief of the division's southern region is **H. G. Hersh** who moves up from the post of St. Louis zone manager, and **T. A. White** has been named to head the Pacific region with territory embracing San Francisco, Portland, and Los Angeles. **G. A. Fredericks** has been appointed supervisor of all field accounts for the corporation's truck and coach division, and he succeeds **H. B. Austin**, recently retired. In the Chevrolet Motor Div., **W. J. Scott**, manager of manufacturing plants, has been appointed to the position of general manufacturing manager. **E. S. Wellock** will take over Mr. Scott's former position and prior to his new appointment was manager of assembly plants. **R. G. Ford**, general purchasing agent since 1940, will succeed Mr. Wellock.

Verne E. Cornell has been appointed chief engineer, WHEELING STEEL CORP., Wheeling, W. Va. He will be succeeded in his former position as general manager of the Ackermann plant by **James F. Baxa**. **M. E. Marsh** has been named assistant general manager of all factories for the company. **R. L. Jolly** has been promoted to general manager at the Wheeling factory, and is succeeded by **H. V. Corcoran** as assistant general mana-



TORRINGTON WIRE DRAWING BLOCK
on the job in Detroit, Michigan

- Designed for high production wire drawing
- Requires minimum time for threading up and removing finished coils
- All controls placed convenient to operator
- Worm gear drive for smooth operation • Safety loop
- Adjustable speed control allows slow start and smooth acceleration to maximum operating speed
- Stops automatically if wire breaks or tangles, to allow for operation of safety loop
- Counterbalanced self-aligning die holder arranged to carry die close to draw ring; permits use of short point on wire
- Hand wheel permits orienting grip to proper position by hand at start of draw
- Guard block protects operator from flying end of wire; and is quickly opened for access to block
- Completed coil drops to table below block, where it is held in location by pins which can be withdrawn under air power for removing the coil from the machine
- Available in several sizes, with draw pull up to 11,000 pounds

Call or write Torrington today for more information and name of nearest Torrington representative.

The **TORRINGTON**
MANUFACTURING COMPANY TORRINGTON, CONNECTICUT

DESIGNERS AND BUILDERS OF MILL MACHINERY FOR OVER 60 YEARS

How continuously it works is what counts

ILLUSTRATED HERE is a handling operation which is typical of the work some trucks perform throughout every shift . . . 24 hours a day! Under such circumstances every delay for servicing or repairs means lost time, lost income.

★

The logical truck for such work is an electric truck. Its motor drive stays on the job because it has few wearing parts . . . *only one basic moving part.*

★

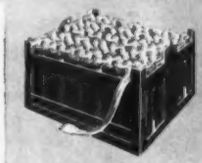
The logical battery to power the truck is an EDISON Nickel-Iron-Alkaline Storage Battery. With steel cell construction inside and out, an electrolyte that is a preservative of steel, and a foolproof electrochemical principle of action, EDISON batteries are the longest-lived, most durable and most trouble-free of all.

EDISON batteries give you many advantages: they're mechanically durable; electrically foolproof; quickly and easily charged; simple to maintain; not injured by standing idle. Get a current EDISON price quotation—you will probably find initial cost MUCH LOWER than you think. Couple this factor with well-known EDISON long life and you will have the key to year-after-year economy.

EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES



EDISON STORAGE BATTERY DIVISION

of Thomas A. Edison, Incorporated, West Orange, N. J.

In Canada: International Equipment Co., Ltd., Montreal and Toronto

IRON AGE INTRODUCES

Continued

ger. **S. C. Wood** and **K. P. House** have been made assistant managers of the organization's tubular sales division. **V. C. Dollman** has been appointed Pacific Coast Manager to replace K. P. House.

Wayne Karber has been named sales engineer in charge of cast stainless steels, the COOPER ALLOY FOUNDRY CO., Hillside, N. J.

W. L. Veit has been appointed specialist on Crescent woodworking machinery to the power tool division, ROCKWELL MFG. CO., Milwaukee. Mr. Veit is former sales manager of the Crescent Machine Co., a post he held after the company became a division of the Rockwell Mfg. Co.

Francis J. Kinsella has succeeded **George A. Gade** as district manager of the Detroit office and warehouse, STANDARD PRESSED STEEL CO., Jenkintown, Pa. Mr. Gade has been appointed regional sales manager in charge of midwest territories. **David J. Hurford**, former Cincinnati area district manager, has become special representative for aircraft products in the west coast area. **William C. Harper** has been selected representative to succeed Mr. Hurford in the Cincinnati post, and **A. Clayton Graham** replaces Mr. Harper in the New England territory.

OBITUARY

Frank V. Bistrup, 68, industrial relations secretary, Associated Industries of Massachusetts, died Sept. 30.

William C. Briggs, 71, mechanical goods salesman, Pittsburgh Branch, United States Rubber Co., died Oct. 3.

William H. Buesser, retired engineer, American Steel & Wire Co., died Oct. 3.

D. W. Norris, 73, President, Lennox Furnace Co., died Oct. 5.

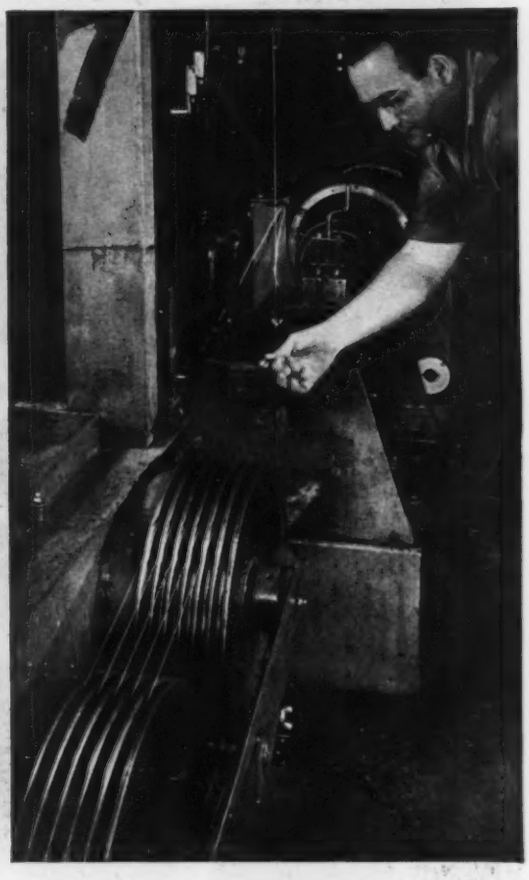
Cortland O. Richards, vice-president, Standard Products Co. of Ohio, died Oct. 4.

Joshua L. Miner, 67, retired vice-president, Lumnite Div., Universal Atlas Cement Co., died Oct. 9.

Resume Your Reading on Page 22

This photograph shows a 3⅛" diameter Monarch Whyte Strand Wire Rope coming off a Macwhyte closing machine. Weight of this rope is approximately 16.65 pounds per foot. It has a strength of approximately 392 tons and is used for the digging line on large dragline excavator with 35 cu. yd. bucket.

In this photograph is a 3/64" diameter Stainless Steel Cord coming off a Macwhyte closing machine. It weighs approximately 0.35 lbs. per 100 feet; has a strength of approximately 270 pounds, and is used for many small cord needs.



Whether you need

LARGE WIRE ROPE or SMALL WIRE CORD

make your selection from

You will get smoother operation and better service when you use the wire rope designed and manufactured to meet your requirements.

Macwhyte engineers are always glad to suggest the correct Macwhyte rope or cord best suited to your needs.

Just drop a card or letter to Macwhyte Company or your Macwhyte distributor.

MACWHYTE COMPANY

2911 Fourteenth Avenue Kenosha, Wisconsin

Manufacturers of Monarch Whyte Strand PREformed, Internally Lubricated Wire Rope, Atlas Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope.

Mill Depots: New York • Pittsburgh • Chicago
Minneapolis • Fort Worth • Portland • Seattle
San Francisco • Los Angeles

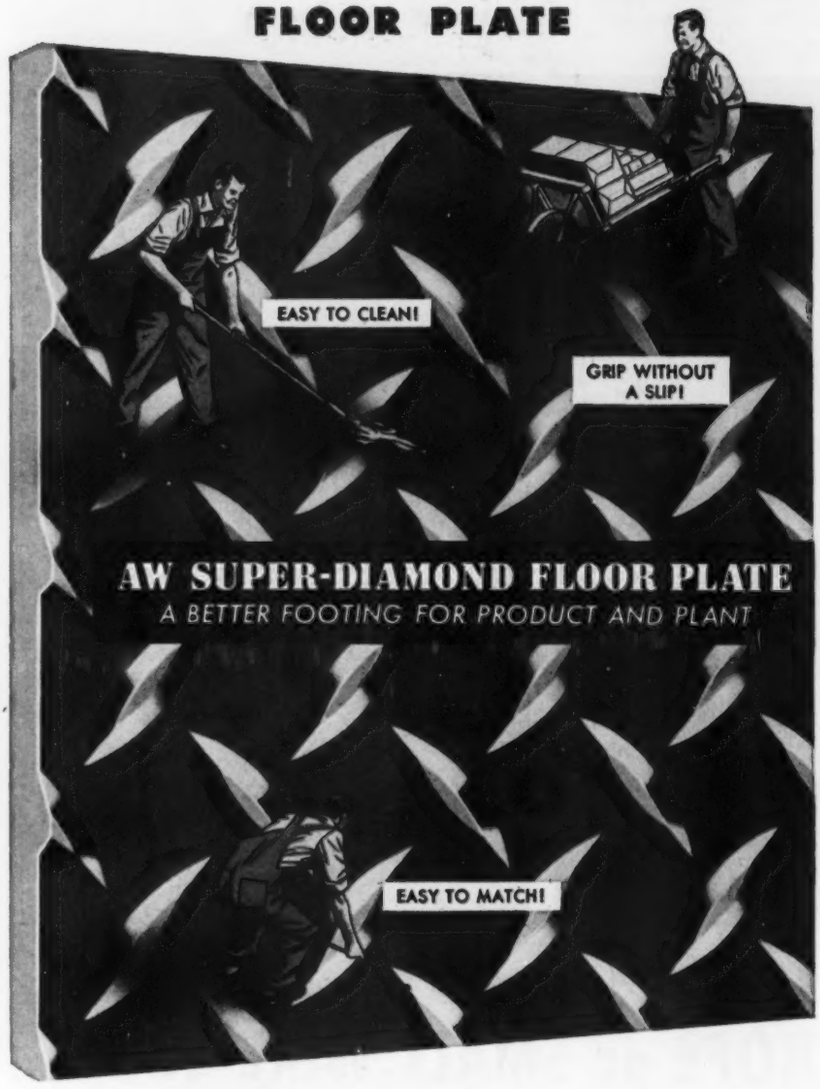
Catalog on request.

a thousand and one
WIRE ROPES
made by
MACWHYTE

Foundation for Safety

AW SUPER-DIAMOND

FLOOR PLATE



So easy to plan and build with—so safe and inexpensive. Exclusive engineered design, with Super-Diamonds at 45° angles, gives grip-without-a-slip safety and makes plates easy to match without waste. Use it for safe, strong, clean loading platforms, fire escapes, walkways, trench covers, running boards, machine tool bases and other product and plant applications.

FREE

16 Page Catalog L-27 It's packed with useful information. Write now.

AW SUPER-DIAMOND

FLOOR PLATES THAT GRIP

A Product of ALAN WOOD STEEL COMPANY
CONSHOHOCKEN, PA.
Other Products: Permaclad, Stainless Clad Steel • AW Algrip, Abrasive Floor Plate • Billets • Plates • Sheets (alloy and special grades)

FREE PUBLICATIONS

Continued from Page 32

letin. Picture-story outlines recommended sequence for the repair of industrial floors. *Flexrock Co. For more information, check No.* 11 *on the postcard on p.* 33.

Centrifugal Pumps

A 24 p bulletin, 995-N, describes and illustrates the improved line of double-suction single-stage centrifugal pumps; 32 p bulletin 964-E, shows the up-to-date construction of non-clogging raw sewage pumps and sewage ejectors. *Buffalo Pumps, Inc. For more information, check No.* 12 *on the postcard on p.* 33.

Hand Chain Hoist

Illustrations and details of latest line of Peerless Packet hand chain hoists are featured in bulletin P-5. *Harrington Co. For more information, check No.* 13 *on the postcard on p.* 33.

Electrical Contacts

A stock list showing 60 standard sizes of solid silver electrical contact rivets with head diameters ranging from 0.093 to 0.250 in., and shank diameters and lengths for various design requirements is now available. *Fansteel Metallurgical Corp. For more information, check No.* 14 *on the postcard on p.* 33.

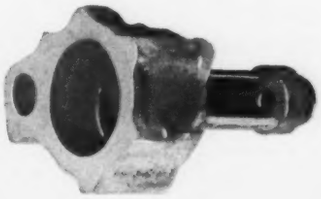
Aluminum Fabricators

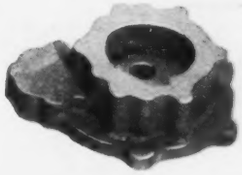
Profusely illustrated 26-p brochure describes the range of products, plant facilities, and technical services on aluminum products. Included are the rolling mill, die making, metal stamping, heat treating, welding, and finishing facilities offered by four fabricating plants. *Aluminum Goods Mfg. Co. For more information, check No.* 15 *on the postcard on p.* 33.

Specialized Bolts

Bulletins 483 to 485 and 491 to 495, inclusive, list and describe the wide line of special purpose nuts and bolts for industrial fabrication and assembly. Typical items are: Adjustable feet, weld bosses and pads for projection welding, adjusting

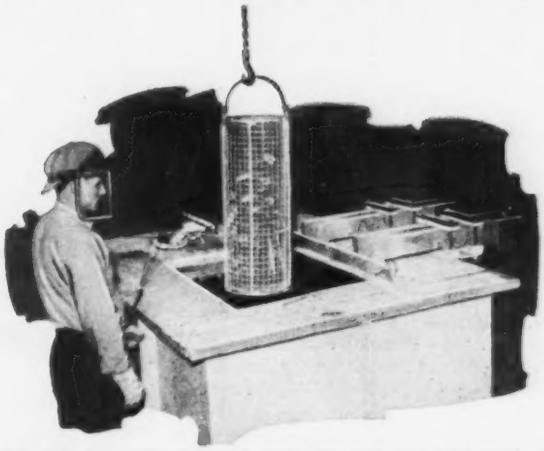
Without pickling losses, you can remove the scale from prefabricated parts





Welded, forged, or cast . . . of any metal or alloy or bimetallic which does not react with molten caustic and whose physical characteristics are not adversely affected at 700°F.

The efficient descaling method is this . . .



Du Pont Sodium Hydride Descaling Process . . . removes all scale without attacking the base metal, without pitting . . . brings metal losses 'way down, reaches hard-to-get-at places, gives a uniform result. Parts retain dimensional accuracy. This speedy cleaning method conditions surfaces for application of hot-dip galvanizing, plating, and other protective finishes.

Get the full story from this booklet

It clearly shows you all the advantages of this process, what it is, how it works and where it is used. Many photographs, diagrams, and important technical data are included. To get the complete story, just clip the coupon, send it to E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

DU PONT

Sodium hydride process for nonelectrolytic descaling

DU PONT

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Electrochemicals Department
Wilmington 98, Delaware

Please send my copy of "Du Pont Sodium Hydride Descaling Process."

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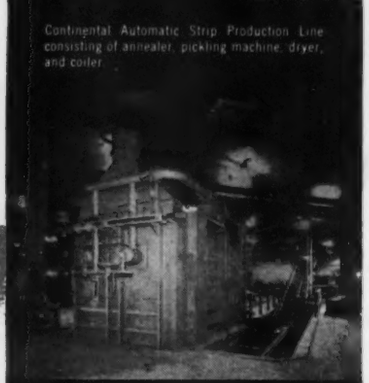
The over-all job in

Production Lines and Special Automatic Machines by CONTINENTAL

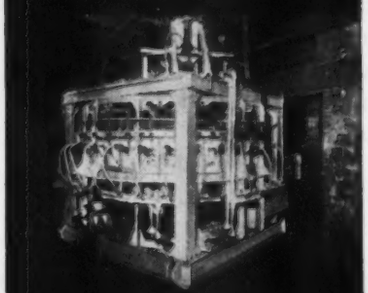
roll back your costs . . .

Continental Automatic Strip Production Line consisting of annealer, pickling machine, dryer, and coiler.



Continental Special Automatic Pig Molding Machine complete with automatic charging, melting, and pouring.

Continental Automatic Production Line operating from raw materials to completely finished and packed product. This production line consists of fifteen integrated, synchronized, special automatic machines.



Continental Special Automatic Glazing Machine complete with automatic press synchronizer and fire polisher.

Manual operations have to be eliminated to really roll back costs. With CONTINENTAL Special Automatic Machines and Integrated Production Lines the labor savings alone reduce costs to a fraction. Besides a better and more uniform product, production is continuous, and waste and scrap are negligible.

CONTINENTAL'S over-all job delivers to you the complete, unitized special machine or production line installed and producing, with results guaranteed.

With over 25 years' experience extending into practically every industry, our continuous research produces many original designs and improved procedures. All of this data is available for preliminary planning. You are invited to share CONTINENTAL'S engineering "round table" to discuss any special automatic machine or production line you have in prospect. There is no obligation.

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District Representatives
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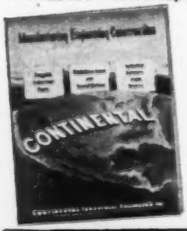

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SPECIAL MACHINES
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MANUFACTURERS—ENGINEERS—CONTRACTORS FOR OVER A QUARTER OF A CENTURY

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screws, spotweld nuts and screws, plus many specialized fittings and fastenings. *Ohio Nut & Bolt Co. For more information, check No.* 16 *on the postcard on p.* 33.

Air-Oil Filters

Catalog FLC-749 lists construction details and industrial uses of electric and oil-bath types of air filters, oil and fuel filters, flame arresters, and oil separators. *Air-Maze Corp. For more information, check No.* 17 *on the postcard on p.* 33.

Small Parts Feeder

Electro-magnetic vibrator that feeds small parts single file, one-at-a-time, without the labor cost of hand feeding is described in pamphlet. *Syntron Co. For more information, check No.* 18 *on the postcard on p.* 33.

Casting Service

How troublesome casting problems in the aluminum permanent mold, aluminum die casting, and zinc die casting fields are solved is illustrated and described in 16 p booklet. *Monarch Aluminum Mfg. Co. For more information, check No.* 19 *on the postcard on p.* 33.

Dry Cyaniding

Descriptive 4-p brochure on dry cyaniding, as applied to the operation of continuous and batch type industrial furnaces for the case hardening of steel, has just been released. *Surface Combustion Corp. For more information, check No.* 20 *on the postcard on p.* 33.

Corrosion Inhibitors

Red Lead technical letter No. 4 describes several of the latest type corrosion inhibitive paint formulations for the protection of iron and steel exposed to marine conditions. *Lead Industries Assn. For more information, check No.* 21 *on the postcard on p.* 33.

Resume Your Reading on Page 33

Steel-Weld FABRICATION

More and more machinery parts and assemblies are being produced in welded steel form. This diesel engine base is typical. In your manufacturing activities, need will arise for a good source for Steel-Weld Fabricated parts. The Mahon organization invites your inspection of its complete facilities for Steel-Weld design engineering, production, and rough or finished machining. A source ready to serve you well, regardless of what your requirements may be . . . a source from which you may expect a smoother, finer appearing job, embodying every advantage of Steel-Weld Fabrication.

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Engineers and Fabricators of Welded Steel Machine Bases and Frames, and Many Other Welded Steel Products

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NEW!
Fansteel "77" METAL

for maximum metal density, mass or inertia in limited space

PROVEN!

A COST-SAVING ACHIEVEMENT in high density (closely approaching pure Tungsten), with ready machinability.

For parts for rotational control within confined space

- Easily brazed, or silver-soldered by ordinary methods.
- rotors, flywheels, governors, balance weights. Entire rotor can be made of Fansteel "77"—or ring of "77" attached to lower density backing—or inserts or studs brazed or screwed to backing.

Radiation shields

- Fansteel "77" is approximately 1.5 times as effective as lead in absorption of radiation. Requires less wall thickness.

Electrolytic fixtures

- Resists attack by solutions. Has great strength with good electrical conductivity. Excellent for current-carrying and contact-making hooks, fixtures, guides or carriers.

Available forms

- square or rectangular bars, round rods, rings, disks, slabs or special shapes—either "as sintered" or finished or semi-finished machined parts.

• ASK FOR FANSTEEL TECHNICAL DATA BULLETIN NO. 5.102. Fansteel engineers will gladly assist in any problem where "77" can be applied; also in design, production, machining and finishing. Fansteel Metallurgical Corporation, North Chicago, Illinois.

11603-B

PURE METALS
Tantalum, Tungsten, Molybdenum, and Columbium in sheet, rod, wire and special shapes and parts.

POWDER METALLURGY PRODUCTS
Finished or semi-finished shapes and parts of special analysis to achieve high strength, density, electrical conductivity, resistance to wear, impact, heat erosion, or combinations of these and other properties.

COPPER BASE ALLOYS
Copper alloyed with other elements, to combine high conductivity with strength, elasticity, resistance to heat, impact, or wear. Available in bars, rod, sheet, strip, castings, forgings, finished or semi-finished parts, for current-carrying springs and other parts, soldering tips, resistance welding electrodes, dies and fixtures.

PRODUCTS & SERVICES INCLUDE:
ELECTRICAL CONTACTS
SELENIUM RECTIFIERS
METALS: TANTALUM, TUNGSTEN
MOLYBDENUM, COLUMBIUM
COPPER BASE ALLOYS
RESISTANCE WELDING MATERIALS

Fansteel

AN INDUSTRY THAT SERVES INDUSTRIES

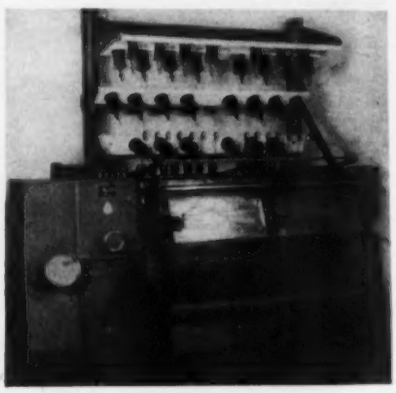
NEW PRODUCTION IDEAS

Continued from Page 36

When the operation is complete, fixtures automatically unclamp and the work rolls into the discharge chute. On the machine illustrated, production of 1060 suspension arms per hr has been obtained. *Davis & Thompson Co. For more information, check No.* 34 *on the postcard on p.* 33.

Coil Winding Machine

Coils requiring insulating paper between layers may be wound automatically at high speeds on a new winding machine. Insulating paper



is fed to a progressive length, automatically cut off, chucked and held in readiness for insertion into the spinning coil at the end of the layer. The arbor winds at a selected speed up to 2500 rpm during the layer, slowing to half speed for the paper insertion, and resuming preset winding speed after insertion. Overall production is approximately 95 pct of selected winding speed. Rugged construction, snap-loaded de-reelers, wire breakage stop control, and full automatic winding cycle make this winder a high production long life machine. *Globe Tool & Engineering Co. For more information, check No.* 35 *on the postcard on p.* 33.

Automatic Bar Feeder

Designed to increase screw machine output by 40 to 60 pct, new fully automatic magazine-loading pneumatic bar feeders make possi-

OPEN SESAME TO PROFITS

To open the door to wider profit margins today, manufacturers must scrutinize every possible way to lower production costs. The press has proved many, many times in the most diverse industries to be the "open sesame" to more efficient production. Clearing presses have the precision and rigidity that mean lowest maintenance expense and highest effective output.

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The Torrington Rotary Swaging Machine uses every bit of stock. With 4000 hammer blows a minute, swaging reduces, sizes, rounds, tapers and points rod, wire and tubing. It makes metal tougher and more resilient. It hammers away minor surface defects.

Torrington Swagers are built to a mechanical perfection based on our 42 years' swaging experience. Send today for your free copy of the illustrated booklet describing the machine and the method.

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Send the coupon today for your free copy of this booklet.

Please send a copy of "The Torrington Swaging Machine" to:

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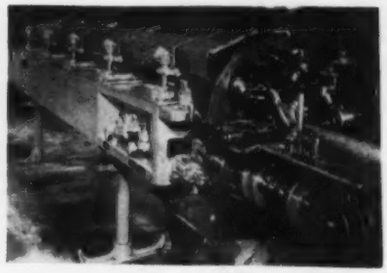
Continued

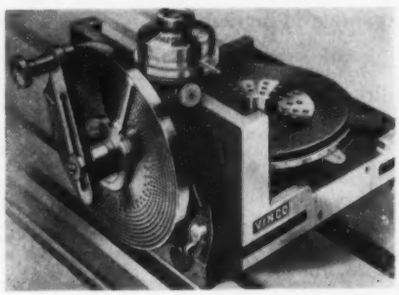
ble normal 8-hr runs with one stock loading of the magazine. Magazine can be loaded with stock bars ranging in number from nineteen ⅝-in. bars to ninety-six ⅛-in. bars. Loading time, by actual time study, ranges from 80 to 114 sec; average time is 100 sec for the complete handling and loading of material



from nearby stockpile to magazine of feeder. The entire reloading and positioning of the bar for the first cut requires approx 4 sec. The work piece length may be set for any feed-out up to 16 in. The machine feeds the stock bar to the last work piece length, then ejects end remnant automatically without the attention of the operator. Idle machine time is eliminated since bar loading does not require the stopping of machine operation. *Lipe-Rollway Corp. For more information, check No. 36 on the postcard on p. 33.*

Indexing Fixture

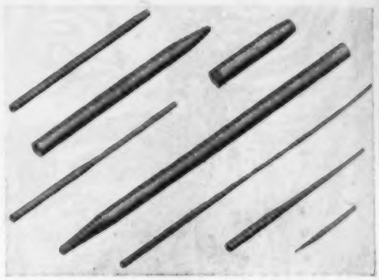
Adaptable to light milling, surface grinding, jig boring and grinding, drilling, engraving, profiling, light shaping, slotting and inspec-



tion, Precisiondex a new indexing fixture, has a guaranteed accuracy of within 30 sec of arc. Its two side surfaces and the bottom surface have been lapped square and flat within 0.002 in., permitting ac-

YOU SAVE

on parts swaged to your specifications by TORRINGTON



Seventy years' experience as the pioneer rotary swaging machine builder enables us to save for you on many types of hard-to-make metal parts.

Typical are surgical and dental instruments, pen and pencil barrels, soldering iron cases, etc. Medium wall tubing up to 2½" O.D. and solid steel .015" to ⅜" diameter handled.

Send your prints and specifications today for prompt quotation, and ask for a copy of "Precision Metal Parts."

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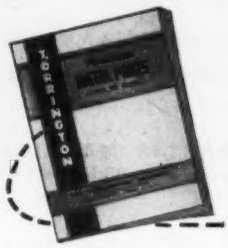

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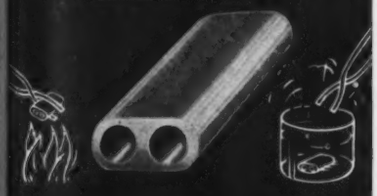
THERMOCOUPLE INSULATORS



This Gordon Thermocouple Insulator, heated red hot and plunged into cold water, came out just as good as new

Available only through GORDON, Serv-rite Thermocouple Insulators are made to stand the gaff of excessive thermal shock far above normal requirements.

For sturdy and reliable thermocouple insulator performance to meet peak production needs — Specify Serv-rite...a Gordon development backed by 32 years' experience in supplying industry with insulators that last longer and give better results.

Serv-rite Thermocouple Insulators—in any type or size—can be supplied immediately from Gordon's large stocks in the Chicago and Cleveland Plants. Remember—you can always distinguish Serv-rite Insulators by their *tan* color.

Fish Spine Beads — Asbestos String
Asbestos Tubing — Single Hole
Double Hole Round — Double Hole Oval

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Specialists for 32 Years in the Heat Treating and Temperature Control Field

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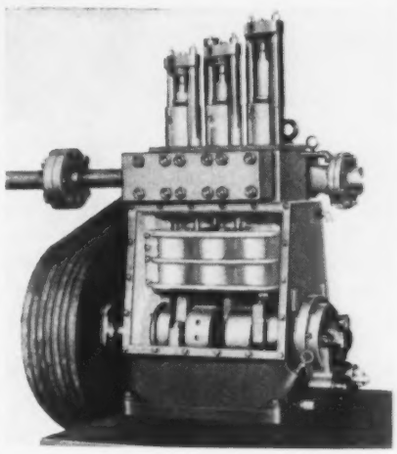
curate setting both horizontally and vertically. A micrometer rachet and pawl arrangement enables a predetermined number of seconds to be added consecutively to each index. A simple one-piece clamp tightens down rim of work-place prohibiting side play or distortion in final setting. *Vinco Corp. For more information, check No. 37 on the postcard on p. 33.*

Direct Flow Pump

Designed for low maintenance and easy accessibility, a series of 5-in. stroke direct flow pumps include 3, 5, 7, and 9 cylinder pumps with hp ratings ranging from 100 to 275. All wearing parts are interchangeable except the main



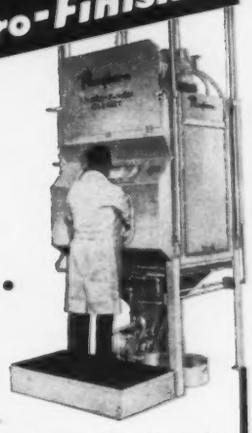
bearings. Removable stuffing boxes at the top of the pump permit adapting other size plungers. The fluid-end is sectionalized and composed of separate units that include the working barrel, stuffing boxes, suction manifold and valve units. Suction and discharge manifolds are separate units. The pump frame is a semi-steel casting of rigid, box-like design. Lubrication is by pressure feed. Direction of pump rotation is optional and drive can be by internal combustion or steam engine, by electric motor or steam turbine. *Aldrich Pump Co. For more information, check No. 38 on the postcard on p. 33.*

Loading Ramp

A staunch portable ramp with an adjustable height feature provides a gradual incline in a matter of seconds for loading and unloading between dock heights and varying bed heights of trucks and trailers.

TOOL and DIE USERS!

Pangborn "Hydro-Finish"



Can Help You...

It improves surface finish, removes oxide scale, increases tool and die life through proper maintenance. Hydro-Finish is the new versatile impact blasting process that uses a fine mesh abrasive suspended in water and holds tolerances to .0001 inches.

In the Tool Room, Hydro-Finish simplifies the manufacture and maintenance of tools, dies and molds. It reduces usual costly handwork and produces a surface virtually free from directional grinding lines.

In the Production Line, Hydro-Finish eliminates many tedious finishing operations. It reduces cost and time involved in buffing. It improves fatigue life of the metal parts it finishes. It cuts many manufacturing costs.

It can be used for surface finishing, lubrication control, removing discoloration, preparing surfaces for plating, finishing threaded sections, plus many other uses.

Find out today how Hydro-Finish can help you.
Write for Bulletin 1400 to PANGBORN CORPORATION, 1201 Pangborn Blvd., Hagerstown, Md.

PANGBORNITE
The best abrasive for all liquid blasting needs.
Available in many mesh sizes.

Look to Pangborn for all the latest developments in Blast Cleaning and Dust Control Equipment.

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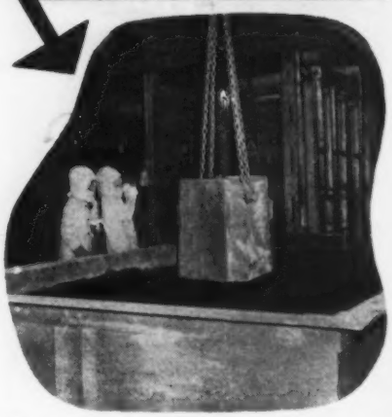
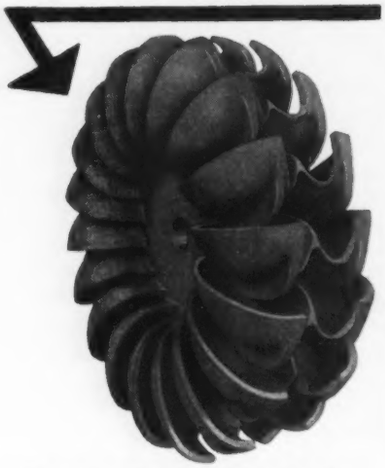
BLAST CLEANS CHEAPER with the right equipment for every job

For Heat Treated
CASTINGS



For Intricate
CASTINGS



Continental's complete foundry and machine shop facilities assure you prompt service on any size castings—of any steel analysis—or physical requirement. Specify annealing, heat treating or any degree of machining on any size casting from 50 lbs. to 250,000 lbs. CONTINENTAL can give you promptly scheduled delivery!

Check first with Continental

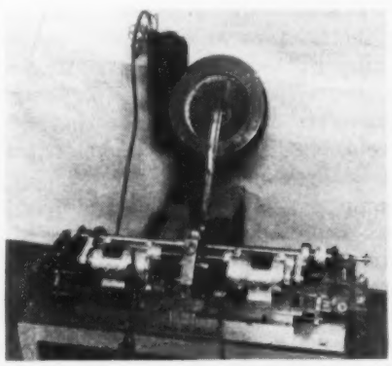
Continental
FOUNDRY & MACHINE CO.
Chicago · Pittsburgh
Plants at:
East Chicago, Ind.; Wheeling, W. Va.; Pittsburgh, Pa.

A mechanical screw-type lifting gear provides a 12-in. variation in height at one end of the ramp. A few turns of a crank will bring the end of the ramp up or down. Wheels may be retracted by cranking to clear the ground, allowing the ramp to move vertically with the truck bed if springs and tires deflect under heavy loading, and

keeping ramp and truck bed aligned. The ramp illustrated is 5 ft wide, 14 ft long and has a 6000-lb capacity. *Barrett-Cravens Co. For more information, check No. 39 on the postcard on p. 33.*

Burring Machine

Burring or chamfering holes in nuts, washers, collars, spacers, pawls and similar items can be performed on an automatic double-ended, burring and chamfering machine at a rate of 100 pieces per



min. Two burring heads feed inward to burr or chamfer both sides of the work, or if one side is already chamfered, the heads will chamfer the opposite side regardless of the position in which they are fed into the machine. A motor-

DON'T
LET IT
HAPPEN
IN YOUR
PLANT!

PICKLING fumes do more than irritate your nose. They carry tiny drops of acid high above the tank and deposit them on roof girders, overhead cranes, conveyors, window frames, pipes and electrical fixtures.

The acid drops are small but they can cause a lot of trouble. They eat through paint and into steel, and rust creeps in behind them. Someday, somewhere, something goes wrong!

Don't let it happen in your plant! Use Oakite Composition No. 38, the new pickling additive that traps the acid fumes before they leave the tank!

FREE The Oakite Technical Service Representative in your city will be glad to show how Oakite Composition No. 38 can hold down your pickling fumes. Phone him or write to Oakite Products, Inc., 30H Thames St., New York 6, N. Y., for further information.

ALSO *ask about Oakite procedures for:*

Cleaning in tanks
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Pickling
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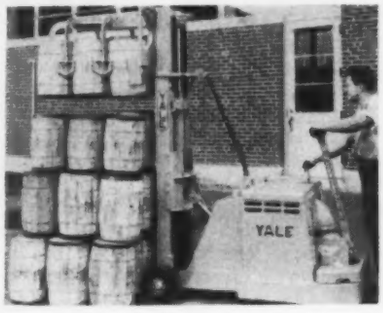
Technical Service Representatives Located in Principal Cities of United States and Canada

ized hopper and feed track carry parts to a pickup cam on the machine. To change from one part to another, the pickup cam must be changed, stroke of burring heads adjusted, and liner and feed track of the hopper unit must be changed. After burring and chamfering are completed, the heads pull away and the pickup cam indexes, bringing a new part into position and dropping the completed part into a tote pan. *Walsh Specialty Co. For more information, check No. 40 on the postcard on p. 33.*

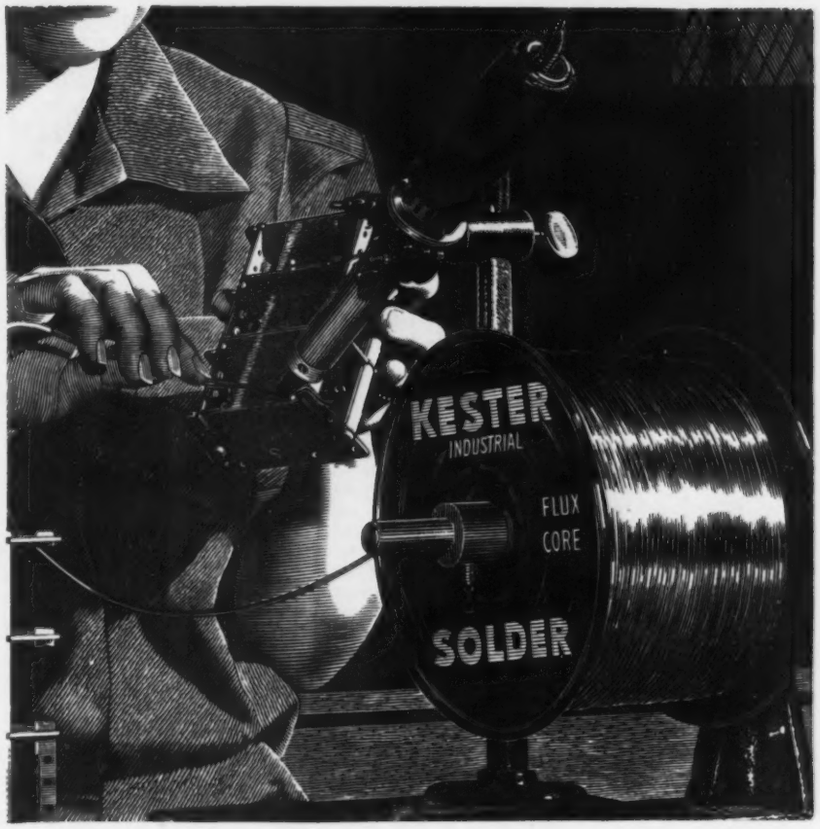
Grasping Fork Truck

A tilting model fork truck of the battery-powered type has been equipped with hydraulically operated fingers that grasp and pick up drums, cylindrical cardboard containers, and kegs without the use of pallets or skids. The truck picks up 1 to 6 cylindrical containers and tiers them 2 to 4 layers deep. The fingers grasp the load from above and suspend it for handling, rather than supporting it from below. This battery-powered hand



truck weighs 3845 lb, has an overall height of 83 in., and outside dimensions of 32⅝x77⅛ in., excluding the grasping mechanism. The truck travels 3 mph with no load, 2 mph under full load, and lifts a 3000 lb load 15 fpm. Operation of the hydraulic fingers, and the lifting and lowering of the entire mechanism, is controlled from levers at the front of the truck. Accidental movement of the truck is prevented by leaving the steering handle in either the horizontal or vertical position. *Yale & Towne Mfg. Co. For more information, check No. 41 on the postcard on p. 33.*

Resume Your Reading on Page 37



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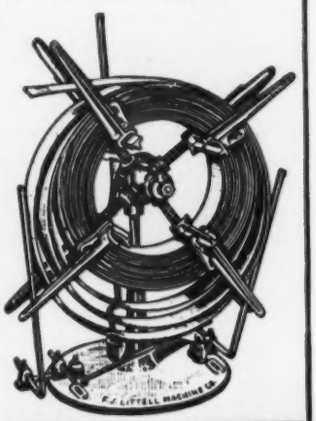

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Look through these pages in the contract manufacturing section. Here you will find many plants who have just the facilities available to expedite your type of job and save you a lot of bother.

FATIGUE CRACKS

Continued from Page 18

they'll lean back in their chairs and have a slug of Pepsi.

Burr

Until we heard from J. Manuele, director of quality control for Westinghouse at Pittsburgh, we were afraid this question of "What constitutes a burr?" was going to create a lot of talk but not much action.

Westinghouse, it seems, has gone right to the heart of the situation and for very good reason. Let Mr. Manuele tell it:

"I was very much interested in reading the discussion on "What constitutes a burr?" under Fatigue Cracks in the Sept. 15 issue of 'my favorite family journal.' Apparently, Mr. Anderle does not punch electric sheet laminations, and for this reason he is spared a very painful headache. . . . In the assembly of the magnetic circuit of an electric motor, or transformer, a number of very thin sheets of steel are stacked together. The thickness of these electric sheets is of the order of 0.020 in.

"If when punching these sheets, a burr is created along the edge of the punching of only, say 0.003 in. in height, it might create a definite problem in assembling the core. These burrs may prevent the 'nesting' of the sheets, thus reducing the amount of steel that can be pressed into a prescribed space limitation, hence, reducing the effectiveness of the magnetic circuit. These burrs may also puncture through the inter-laminar insulation used for reducing eddy-current losses. This further reduces the effectiveness of the magnetic circuit.

"Up to the present time, there has been no adequate, economical, and fast method of measuring the height of these burrs. Within the past 3 months, the Westinghouse Electric Corp. has developed a gage for this purpose and the patent rights have been assigned to B. C. Ames, gage manufacturers, of Waltham, Mass. The first eight gages of this type have recently been delivered, and it is hoped that, from now on, standards of permissible burr height may be established, so that punch press tools can be controlled in order to reduce the production of electric laminations having excessive burrs."

This gage could neatly resolve the whole answer: If it can be measured on an Ames gage, it's a burr. If not, it's the customer's imagination.

Resume Your Reading on Page 19

ONLY A BALL

has { one dimension / one surface

but oh—how important

Important not only in precision ball bearings, but also in the lot of other applications where Strom metal balls have been doing the job better. Strom has been in on a great many ball-application problems, and knows how important these two factors are for the best results.

Strom has been making precision metal balls for over 25 years for all industry and can be a big help to you in selecting the right ball for any of your requirements. In size and spherical accuracy, perfection of surface, uniformity, and dependable physical quality, there's not a better ball made.

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• *News of Industry* •

British Group to Study Our Materials Handling Equipment

Washington — British industry sent a delegation to the United States late last month to find out more about materials handling equipment.

The Economic Cooperation Administration said the group of about 12 industrial experts will stay for a 6-week study of materials handling equipment and other mechanical aids common to U. S. industry.

The visiting group will include Alfred Roebuck, director, Hadfields, Ltd., of Sheffield, team leader; Walter John Thomas Dimmock, assistant works manager, of Hoover, Ltd., Greenford, Middlesex, team secretary; Herbert Stirling Carnegie, English Electric Co., Ltd., Stafford; Ernest George Taylor, G.E.C., Ltd., Manchester; Norman Allen Jenkinson, Babcock & Wilcox, Ltd., London; John Reginald Sharp, Lansing Bagnall, Ltd., Basingstoke; William Morten Hirons, Humber, Ltd., Coventry; Norman MacDonald, Consolidated Pneumatic Tool Co., Ltd., Frasorburgh; Euman Williamson, Rover Co., Ltd., Meteor Works, Solihull, Birmingham; Benjamin Gardner, Amalgamated Engineering Union, London, and James Young, Assn. of Engineering & Shipbuilding Draughtsmen, London.

Completes New Transport Plane

Santa Monica, Calif. — Initial test flights have been completed on the Douglas DC-6A liftmaster which is said to be America's first postwar transport plane designed specifically for high speed, low cost, long range transportation of air freight.

The new plane was developed from the DC-6 passenger transport which has been flying for 2 years. The cargo version is 5-ft longer than the passenger ship and is capable of carrying a 30-lb payload at more than 300 mph. It has a cargo capacity of 5000 cu ft and access to this area is provided by two large cargo doors, one forward and one aft of the wings.

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Up-to-date knowledge of modern resistance welding is a *must* for your key men. Get this money saving information to them *now!*

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2. **A full-color, sound motion picture,** running about a half hour, showing how resistance welding solves problems similar to yours.
3. **Fully-illustrated highlights booklets** for individual study and review.

Convince yourself first—

We want you to judge for yourself whether the resistance welding program will pay off in your plant. That's why we offer business executives this chance to examine the *Resistance Welding Manual* without cost.

Showings cost you nothing. With your manual, we'll tell you how to arrange for a FREE film showing.

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No messy job of costly cleaning . . . Houghto-Solv will percolate through the oil to the bottom of the tank and attack sludge, dissolving it and making it possible to burn what you used to clean out and throw away.

Houghto-Solv is not just another solvent. It's different . . . more powerful . . . harmless to the system . . . more sure and effective. After using this modern treatment, burner tips will be bright, lines clean, tanks free of sludge, soot minimized.

Houghto-Solv is marketed by a company with 84 years of experience in petroleum products and additive treatments. For a demonstration, write E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia 33, Pa.

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—Dear Editor . . .

PICKLING MACHINE

In the Sept. 8 issue in Newsfront is mentioned development of a new hermetically sealed spray pickling machine. We would appreciate further information on same, or references enabling us to make direct contacts.

HERBERT KENMORE
President
Kenmore Metals Corp.
Jersey City, N. J.

Contact the R. C. Mahon Co., Detroit, for additional information.—Ed.

SMOKE AND DUST CONTROL

We have read with interest in your issues of April 7 and April 14 the articles "Sonic Agglomeration of Smoke and Dust" and "Ultrasonic Generators for Industrial Dust Control." Would it be possible for you to advise us of the addresses of the American builders who have put into operation the apparatus described by your authors.

J. ANDRE
Compagnie de Produits Chimiques et Electrometallurgiques
Paris, France

Copies of your letter have been forwarded to the authors, who can supply the information you seek.—Ed.

PLASTICS

In Newsfront of the Sept. 22 issue you refer to a new plastic called Fluorothene, which has been developed as a result of atomic bomb research. Can you furnish additional information as to manufacturers?

J. S. SWAN
Chief Engineer
Standard Railway Equipment Mfg. Co.
Hammond, Ind.

Names of plants reported producing this material are being forwarded.—Ed.

ELECTROCHEMICAL POLISHING

I am working on the electrochemical polishing of metals, especially copper, iron, and the respective alloys. In my research I have encountered many difficulties, both theoretical and practical. Perhaps your readers will be kind enough to give me a helping hand in making available for me in Israel the latest literature in the field, and arranging connections with authorities engaged in the same research.

Dr. ANDOR YEHUDA GAL
8 Antebi St.
Tel-Aviv, Israel

VACUUM PUMPS

We would appreciate receiving tear sheets of "Performance Data For High Vacuum Pumps," by W. H. Kohl, which appeared in the July 28 issue.

CHESTER G. SALMON
Bausch & Lomb Optical Co.
Rochester, N. Y.

COLORIMETRIC ANALYSIS

May we please have tear sheets of the April 28 article entitled, "A Guide to Colorimetric Methods of Analysis," by L. Silverman.

H. DONALD WHITE
Chemist
White Machine Works
Eau Claire, Wis.

STAINLESS STEEL

We have read with a great deal of interest the article published in the July 7 issue regarding the machining of stainless steel. Because of the excellent data contained in the piece, we are wondering if you will send us another copy.

H. M. FERRIS
Rensselaer Valve Co.
Troy, N. Y.

A copy of the article, "Machining Stainless Steels," has been mailed.—Ed.

OPA PRICES

Can you furnish us with a list of OPA prices and basing points on the principal iron and steel products?

B. H. TRIGG
Vice Pres., Sales
Tredegar Co.
Richmond, Va.

Tear sheets of the price pages indicating the OPA structure in 1945 have been sent, as well as a copy of a basing point chart from Jan. 1, 1948 issue which shows the basing point structure as it existed immediately prior to adoption of f.o.b. prices.—Ed.

HEAT TREATING

I greatly enjoyed reading the article that appeared in the Sept. 1 issue by R. P. Seelig on the subject of heat treatment of tool steel by martempering. Attached is a letter that I have written to the author and which I would appreciate your sending to him since I do not know where he may be reached.

L. B. ROSSEAU
Asst. Vice-President
Ajax Electric Co., Inc.
Philadelphia

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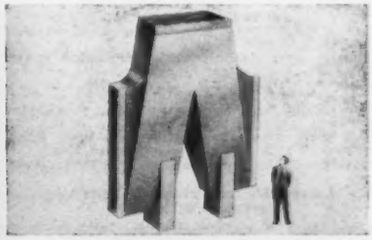

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CINCINNATI GILBERT 3½" bar, floor type, latest
GIDDINGS & LEWIS #25T, 2½" Bar, latest type
GIDDINGS & LEWIS #45, 5" Bar Table Type, latest
LUCAS #11, 3" bar, Table Type, "Precision", Latest
NILES-BEMENT-POND 3", 8" bar, Floor type, M.D.
UNIVERSAL 3" bar, high speed, latest type

BORING MILLS—Vertical
BULLARD 12" 6 Spin. Mult-Au-Matic, Type D, latest
BULLARD 16" 6 Spin. Mult-Au-Matic, Type D, latest
BULLARD 24", 36", 42" "Spiral Drive," Latest Type
KING 62", 2 swivel heads, P&T, M.D.
NILES 100", 2 swivel heads, P&T, D.C., Motor Dr.

DRILLS—Miscellaneous
AMERICAN 4' arm 11" col., "Hole Wizard", Latest
LELAND & GIFFORD #2 LMS 6 spindle, Latest
NATCO 4 AL 30 spindle, Multiple, Latest Type
PRATT & WHITNEY 11in50" Deep Hole, Latest

GEAR CUTTING EQUIPMENT
BARBER COLMAN Type A, Hobber, Latest Type
FELLOWS 6lA, #61, #7, #7A, #72, #75, #77, #2, #6#2, High Speed Gear Shapers, latest type
GLEASON 3", 12" straight Bevel generator, Latest
GLEASON 24", 37" Bevel Gear Planer, Motor Drive
GOULD & EBERHARDT 12H, Hobber, Latest Type
GOULD & EBERHARDT 96H, Hobber, with diff.,m.d.

GRINDERS—Cyl.—Plain & Univ.
BROWN & SHARPE #1, 2, 3, 4, Universal, Latest
BROWN & SHARPE #13 Univ. Cutter & Tool, Latest
LANDIS 4x12, Type H Plain Hyd., Latest Type
NORTON 6x18", 10x72", 14x36", Type C, Plain, latest
NORTON 6"x30", 10"x36", type C, Pl. Hyd., latest

GRINDERS—Miscellaneous
BARBER COLMAN #3, 4, hob sharpener, latest type
CINCINNATI #2, #4 Centerless "Filmatic," latest
HEALD 72A3, 72A5 "Gagematic," internal, Latest
HEALD 75A, 72A3, 72A5, 74, Internal, latest
LANDIS #12 Centerless, Hydraulic, Latest Type

GRINDERS—Surface
BLANCHARD #11, 16" chuck, Latest Type
HANCHETT Series 300, 12"x18" Vert. Sp. Hy. Latest
HEALD #22 Rotary, 12" chuck, latest type
HEALD 25A—Rotary—16" and 30" chuck, hyd., latest
THOMPSON 12x12x24 Type B Hyd., Latest Type

LATHES—Engine & Mfg.
AMERICAN 36"x360" centers, 2 carriages, motor dr.
LODGE & SHIPLEY 14"x30", 16"x30" Centers, latest
MONARCH 16"x20" centers, Model EE Timken, latest
MONARCH 12"x30" Centers, 12x54" Centers, Model CK, Timken Bearing, Latest Type
MONARCH 22"x456" centers, 3 carriages, Timken Bearing, Model CM, motor drive
NILES 30x50" Boring, Timken, Latest Type
PRATT & WHITNEY 14"x54" Centers, 16"x30" Centers, Model C, Timken Bearing, Latest Type

LATHES—Turret
BARDONS & OLIVER #5, #7, Timken, Latest Type
FOSTER #4FU "Fastermatic" Timken, Latest
GISHOLT #1L, #2L, #3L, Universal, Timken, Latest
GISHOLT #3, #4, Univ. TIMKEN, Latest Type
JONES & LAMSON #3, #5 Univ., Timken, Latest
MOREY No. 2G, No. 3, No. 4, Timken Bearing, latest
WARNER & SWASEY #2A, 3A Univ. Timken, Latest
WARNER & SWASEY 4A Universal, Timken, Bar and Chucking, (New 1947)

MILLING MACHINES—Plain
BROWN & SHARPE 2B, 3B, Timken, Latest Type
CINCINNATI 4-36, 2-18 Hydromatic, Simplex, latest
KEARNEY & TRECKER 12H, 14M, Latest type
KEARNEY & TRECKER 2H, 3H, 4H, Timken, latest

MILING MACHINES—Thread
LEES BRADNER 12"x54", Model HT, Latest Type
MOREY 12"x30" and 60" centers, Latest Type
PRATT & WHITNEY 6x60", Model C, Latest Type

MILLING MACHINES—Universal
BROWN & SHARPE 2A, 3A, Timken, Latest Type
KEARNEY & TRECKER 2H, Timken, Latest Type
VAN NORMAN #26, #36, Timken, Latest Type

MILLING MACHINES—Vertical
BROWN & SHARPE #2B Timken, Latest Type
CINCINNATI #2, Dial Type, Timken, latest type
GORTON #8D, 8½D high speed, latest type
KEARNEY & TRECKER #3H, Timken, latest

PLANERS
BETTS (CONSOLIDATED) 84"x92"x16', 4 heads, Box Table, Power Rapid Traverse, D.C. M.D.
BETTS (CONSOLIDATED) 108"x84"x50', 4 heads, Box Table, Power Rapid Traverse, D.C. M.D.
NILES "Time Saver" 42"x42"x14', 3 heads, Rapid Traverse, A.C. vari-voltage drive, Latest
NILES 72"x72"x30' 4 heads, Power Rapid Traverse, Box Table VARI-VOLTAGE DRIVE
NILES 108"x84"x42', 4 heads, Power Rapid Traverse, Box Table, D.C. reversing motor drive

SCREW MACHINES—Automatic & Chucking
CONOMATIC 2¾"—6 spindle, Latest Type
GOSS & DeLEEUW 6"x6¾" Auto. Chucker, Latest
GOSS & DeLEEUW 8" auto. Chucker, 5 spin., Latest

MISCELLANEOUS
BARNES #172, 306H, 307, 307B Vertical Hone, Hydraulic, Self-Oiling, Latest Type
CINCINNATI 1-30, 3-30, Duplex Vert. Surface Broach, Double ram, Model ER Hyd., Latest Type
CINCINNATI Series 300, ½"x8'6" Press Brake, MD
HENRY & WRIGHT 50 ton Dieing Press, M.D.
LAKE ERIE 500 ton Vertical Hydraulic Press, latest
MICHIGAN 1708, 1712 Universal Reliever, Latest
VERSON #206, 10 gauge x 96" cap. Press Brake, latest

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News of Used, Rebuilt and Surplus Machinery

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. . . Anticipated Government Business Stimulates West Coast Optimism . . .
Fourth Quarter Business Reported Improved

Demand Remains Strong For Rebuilt Diesel Power Plants

New York—No slowdown in orders is seen by a large rebuilder of diesel power units. Remanufactured diesel engines for new electric generators are experiencing high demand both domestically and abroad.

Immediate shipment on all orders by this company, in contrast to the 1 to 1½ year delivery time of British and European manufacturers, is a primary reason for sustained activity abroad. During the past year shipments to India, East and South Africa, Switzerland, Chile, Iran, Australia, Brazil, and Venezuela have made business for the 12 months ending in July better than the comparable period ending July, 1948. Present business activity indicates a continuation of this trend; domestic activity is steady, and the devaluation of British and European currencies does not seem to be standing in the way of purchasers who have need for immediate delivery of these units.

During the past year the total domestic and overseas installations of rebuilt diesel power units exceeded 90,000 kw. A typical fast moving item at present is the 1250 kva, 1000 kw GM diesel powered unit, developing 1600 hp at 720 rpm. Some of the more prominent installations made recently include 5000 kw for Cliffs Power and Light Co., Ishpeming, Michigan; 4000 kw for Belem, Brazil; 3750 kw for Parkinson Strip Mining Co., Ltd., Bedington, England; 4000 kw for Colombo, Ceylon; 4600 kw for irrigation projects throughout India; and 3600 kw for power generation in East Africa.

Increases Inquiries And Sales Reported in Eastern Pa.

Philadelphia—Dealers in used machine tools are experiencing a greater response to current offerings than during the summer months, when buying activity was almost suspended. Inquiry volume has shown a considerable improvement, and order volume is expected to build up after the customary one to two month lag.

Dealers who have turned their attention to foreign business have been speculating on the effect of devaluation. It is the general impression that dollars will become

Turn to Page 138

MDNA CHAPTER SCHEDULES

Chapter	*Date*	*Time*	*Place*
Philadelphia	Tuesday, October 25	6:30 p.m.	Warwick Hotel
Chicago	Thursday, October 20	6:30 p.m.	Steak House
Detroit	Tuesday, October 11		Hotel Fort Shelby
Los Angeles	Tuesday, October 25		Los Angeles Elks Club
New York	Monday, October 31	6:30 p.m.	Cavanaugh's 23rd St.

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★ TOOL ROOM EQUIPMENT

BORING MILLS: 8—Lucas #42, #41, (3) #31. Defiance #25C. Giddings & Lewis #25T, horizontal Table Type. Gisholt 38" Vertical.

JIG BORERS: 4—(2) Pratt & Whitney #3B. Fosdick #30. Vernon 12".

MILLING MACHINES: 50—(3) Cincinnati Hydro-Tel Verticals with Followers. Cincinnati #4 Vertical High Power. (2) Milwaukee Bridge-Type Horizontals. (12) Van Norman Dupiex #2, #3, #20, #36. (3) Cincinnati #2, #3, #4, Verticals. (9) Milwaukee #2B Univ. #2B, #2AS, #3B, #2BS. (2) Kempsmith #2 Univ. & Plain Vert. (2) Brown & Sharpe #3, #2B. (4) LeBlond #2 Plain. (2) Valley City UMI½ Univ. Becker C. (11) Kent-Owen, Nichols, U.S.; Whitney Hand Millers.

PLANERS: (2) Cleveland Open Side 42" x 42" x 10'. Sellers Power Flow 44" x 48" x 15'. LATHES: 20 Engine Lathes, i.e., 12" x 6'; 24" x 12' to 54" x 8'. Monarch, American, Hendey, LeBlond, Prentice, New Haven, Boye & Emmes, Schumaker & Boye.

TURRET LATHES: 14—Warner & Swasey #3A, (2) #2A (9) #4 (2) Foster #9, #1.

RADIAL DRILLS: 12—Carlton 5' 11". Cincinnati-Bickford 4' 9". (4) American 3' 9"; 3' 11". Hammond 4 Jack-Knife. (5) Walker-Turner 30".

SHAPERS: 8—(2) American Standard 20", (4) Gould & Eberhart 20", 16". Smith and Mills 16". Johnson 14".

GRINDERS: 20—(2) Blanchard #18, 30" Rotary. (2) Centerless Cincinnati #2 & Heim. (3) Heald #85, #75, #70. (2) Brown & Sharpe #2 Univ., #14. (2) #2 Surface. Monarch Surface. (3) Robot #2 Surface. Covel Univ. Tool & Cutter. #1 Univ. Tool & Cutter. Ex-Cell-O Carbide Tool & Cutter. (50) Abrasive Cut-off, Die, Bench & Flexible Shaft Grinders.

DRILL PRESSES: 67—(3) Bausch 16 Spdl. (2) Fox 6-8 Spdl. (3) Colburn #2 H.D. Delta 8 Spdl. (25) Delta 4 Spdl. (3) Rockford, Henry & Wright 4 Spdl. (30) Rockford, Delta, Canedy-Otto, Demco, Milwaukee, Excelsior, Atlas Single Spdl., Floor & Bench.

BOLT HEADER: Manville #4 Double Stroke Solid Die Bolt Header.

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CENTRIFUGAL CASTING MACHINES: (7) Commerce Hydraulic Horiz. & Vert. with Interchangeable Molds. Book Molds.

MOLDERS: (17) Osborne, Tabor Hydraulic, Tabor Platen, Midland, Pridmore, (3) Osborne Core Blowers. (7) Ross Core Drawers. (2) Lowe Sifters. (2) Royer Portable Sand Separators. (2) Cartridge Core Blowers. #1½ Simpson Intensive Sand Mixer, Kane & Roach Core-Wire Straightener. (10) Marvel, Oliever, Grand Rapids Metal & Sprue Cutting Saws. (9) Cincinnati 38" D.E. Grinders. (3) Tabor Abrasive Cut-Off Saws. (5) Hobart Portable Arc Welders. Asteebolaget Alpha (Stockholm) Brinnel Hardness Tester. 3' Double Arm Flame Cutting Radial Follower. (6) Globe Tumbling Barrels. (40) Core Ovens, Heat Treat & Melting Furnaces i.e., Young Bros., Stevens, Bellevue, Iler, Standard, Multiple Unit for Gas, Electric & Oil. Ladle Heating Unit, Sly Sand Blasts, Blast Gates, Schmieg & Garden City Dust Collectors, Conpressor Blowers, Quenching Tanks. (7500 Aluminum, Steel, Cast Iron Flasks, Jackets, Bands, Bottom Boards, etc.

★ PATTERN SHOP

SURFACE PLANERS: (2) Crescent Single Surface 18", 24" American 2 Spindle Shaper, Moak 16" Jointer. (2) Greenlee 36" Band Saws. Walker-Turner Radial Saw, Oliver 84" Face-Plate Lathe. Imperial 20" x 10'; Porter 16" x 6' Wood Lathes. (6) Disc Grinders 15"-24". Disc Filer. Vertical 21" Sander. Scroll Saws. Pattern Shop Laboratory Equipment. Pattern Lumber in Mahogany.

ALSO: Ingersoll-Rand 8 x 8 Horiz. Duplex (late), 12 x 10 I.R. Horiz. Worthington 7 x 7 Horiz. Air Compressors. Bakewell, Garvin, Rickert & Schaefer Precision Tappers. (3) 4 Spdl. Gridley Automatics. Do-All Matelmaster Davis Key Seater. Acme #2 Power Shear (5) O.B.I. Punch Presses, Toledo #4, Niagara #3, Consolidated #18, Loschbaugh & Jordan #2. Tube Bender (7) Electric Hoists to 6 ton. (5) Cranes. (50) Chain & Hydraulic Hoists. Complete Laboratory with Industrial X Ray Unit. Inspection Equipment, Auto Trucks, Thousands of items in Shop & Factory Equipment, Motors, Tool Cribs, Office Furniture, Business Machines, etc., etc.

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No. 16 New Britain 6 spdl. Chucker
8" Bullard 6 station Multaumatic
No. 454 New Britain chucker
14" x 19" Fay chucker
No. 2 FU Foster Fastermatic
2⅝" Acme Gridley model RA6
2" x 18" Cleveland model B
1⅞" Conomatic B spindle
1⅝" New Britain model 61
1 1/16" Cleveland "M" 4 spindle
⅞" & 1¼" Cone 4 spindle
½", No. OG Brown & Sharpe
9/16" Acme Gridley model R6
1" Economy bolt shaver

BROACHES

3 ton American vertical
30 ton (48" str.) American vert.
No. 1 Foote Burt duplex surface
9 ton American horiz. surface
No. 3XA Oilgear
Twin Ten Oilgear duplex

DRILLS

Nos. 121, 217, 315 & 513 Baker
No. 30HO Baker 2 spdl. inverted
No. 217 Baker 3 spindle
20" Cint. Bick. Super Service
21" & 24" Cint. Bick. Upright
3' Morris radial
4' Cint. Bick. univ. radial
6' Dreses radial
7' American radial
24 spdl. No. B4A Natco multiple
16 spdl. No. B2L Natco multiple
36 spdl. No. W6 Baush multiple

GEAR CUTTERS

Nos. 8H, 12H, 16HS & 18H G & E
Nos. 3, 12 & Model T Barber Colman
Nos. 1, 5A & 5AC Lees Bradner
No. 5M Adams Mfg. hobber
No. 61 Fellows gear shaper
12" Red Ring gear shaver
18" Gleason testers & lappers

GRINDERS

24" x 36" Springfield surface
14" x 36" Pratt & Whitney surface
No. 10 Blanchard surface
No. 2 Cincinnati centerless
6" x 18" No. 10 Brown & Sharpe
10" x 24" Landis hydr. univ.
No. 2 Norton univ. T. & C.
53", No. 372 Besly horiz. disc
30", No. 230 Hanchett opposed disc
15", No. 115 Gardner opposed disc
No. 72A Heald Sizematic Internal
No. 16A 16 & 24-36 Bryant Internal

MILLS, BORING

2½" No. 25 Giddings & Lewis
3" No. 31 Lucas
3" No. 3A Universal
3¾" No. 32 Lucas
3¾" No. 5A Defiance
5" Jones, planer table type
24" & 42" Bullard vertical
52" King vertical
100" Niles Bement Pond vert.

MILLERS

Nos. 2AS, 2, 3B & 4B Milwaukee
No. 3 Cincinnati universal
Nos. 2M & 2 Cincinnati vertical
No. 2H & 3H K. & T. vertical
Nos. 1H, M18, M24 & 12-24 K. & T. Mfg.
Nos. 1-12, 1-18, 2-18 & 2-24 Cincinnati
No. 0B Cint., plain vert., rise & fall
Cincinnati Hydromatic Nos. 3-24, 34-36, 4-36, 4-48, 5-48, 56-72 & 56-90
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30", 42" & 84" Ingersoll rotary
24" x 24" x 16' Ingersoll adj. rail
Nos. 1M, 2 & 3 Kent Owens hand
No. 12 Brown & Sharpe Mfg.
Nos. 4, 40 & CT36 Lees Bradner thread
Types C & D Hall planetary
No. 12B Pratt & Whitney profiler
Vernon jig borer
No. 2 Pratt & Whitney jig borer

MILES MACHINERY CO.

SAGINAW, MICH.

Continued from Page 134

available for machinery purchases by nations that have blocked off imports for a long time. Inquiries from foreign buyers have been received right along, subject to the granting of import licenses, but these inquiries have not resulted in business because of the lack of dollars.

Now it is expected that dollar balances may be built up and import restrictions relaxed. Some observers believe that the first effects of devaluation on the export market for used machinery may be seen in about six months. Others, more optimistic, believe that results may appear sooner.

West Coast Gets Diesel Plant

New York—The A. G. Schoonmaker Co., New York City, recently opened a new rebuilding plant for diesel equipment at Sausalito (San Francisco), Calif.

The new plant comprises an area of more than 9½ acres and includes two buildings for remanufacturing, three for storage and one for tools. The new location has several railroad sidings, with one spur line running completely through the main shop. Another feature of the main shop is an engine test stand designed to accommodate both stationary diesel electric and marine diesel applications up to 3000 hp capacities.

The new plant permits buyers to inspect power units in operation before purchase.

Western Business Optimistic

Frank J. Lunney, president of the Machinery Dealers National Assn., reported to the Philadelphia chapter of MDNA on Oct. 6, at a special meeting, the results of his recent trip to the West Coast on MDNA affairs. Used machinery business on the Coast, according to Mr. Lunney, is spotty and much the same as in the eastern part of the country. However, there are some indications of potential Government contracts that may be let in that area that makes dealers optimistic of business in the near future.

Resume Your Reading on Page 135

CUT YOUR PRODUCTION COSTS! SAVE MONEY HERE!

TURRET LATHES

Jones & Lamson #5 Ram Type Univ. 20 to 1000 RPM—2½" bar cap., 21⅛" swing—Bar & Chucking—Tooling—Rapid traverse to cross slide.

Jones & Lamson #7A & #8A Saddle type Univ.—20 to 1000 RPM, 21¼" swing—(equal to new).

Warner & Swasey #3A Saddle type Univ. Heavy-Duty 4½" bar cap., quantity of tooling—very late.

LATHES

American 16" x 126" Centers, 12 speed Hi-Duty Gr. Hd.—18½" swing, Timken Brg. (late).

Monarch 18" x 56" Centers, "MBB", 16 speed Helical Gr. Hd.—22½" Swing—Keller attchmt. (very late).

Lodge & Shipley 24" x 12'—12 speed Gr. Hd.—27½" Act. Swing—81" C. Dist.—8 to 315 RPM.

American 30" x 25', 12-speed Gr. Hd., Mrd. Pattern Hi-Duty—6 to 260 RPM—34½" act. swing—18' C. Dist.

UNIVERSAL MILLING MACHINES

Van Norman No. 2SU Univ. Knee Type—wkg. surf. tbl. 50" x 12"—25 to 1250 RPM—range 28" x 10" x 17"—(very late) attchmts.

Brown & Sharpe No. 2 Lite Type—wkg. surf. tbl. 45" x 10"—40 to 1300 RPM—range 28" x 10" x 13"—vert. hd.—attchmts.—(late).

Cinn. No. 2 Dial Type Med. Speed—wkg. surf. tbl. 62½" x 15¼"—20 to 500 RPM, range 28" x 10" x 18"—Vert. Hd. and attchmts.

BORING MILLS (Horiz. table type)

Universal, 4" bar "Triway" (late)—added vert. range—speed 8 to 300 RPM—face plate to outer support 72"—top tbl. to centerline spdl. 48", taper No. 6 Morse.

Defiance No. 25A, 3-¾" bar (late)—added vert. & cross range—speed 12 to 1000 RPM—face plate to outer support top tbl. to centerline of spdl. 48"—cross travel tbl. 72"—taper No. 6 Morse.

Yoder No. 3A, 3" bar (late)—long. tbl. travel 52"—dross travel 30", 12 to 569 RPM—taper No. 5 Morse.

(New) Rafter Squaring Shears—available in two sizes: ¼" x 10' mild steel, ⅛" x 10' stainless steel; 3/16" x 12' mild steel, 3/32" x 12' stainless steel. Immediate delivery from stock.

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70A Heald Internal Grinder
#174 Heald Internal Gap Grinder, 54"
#3H Kearney & Trecker Plain Miller
#3MS Cincinnati Plain Miller

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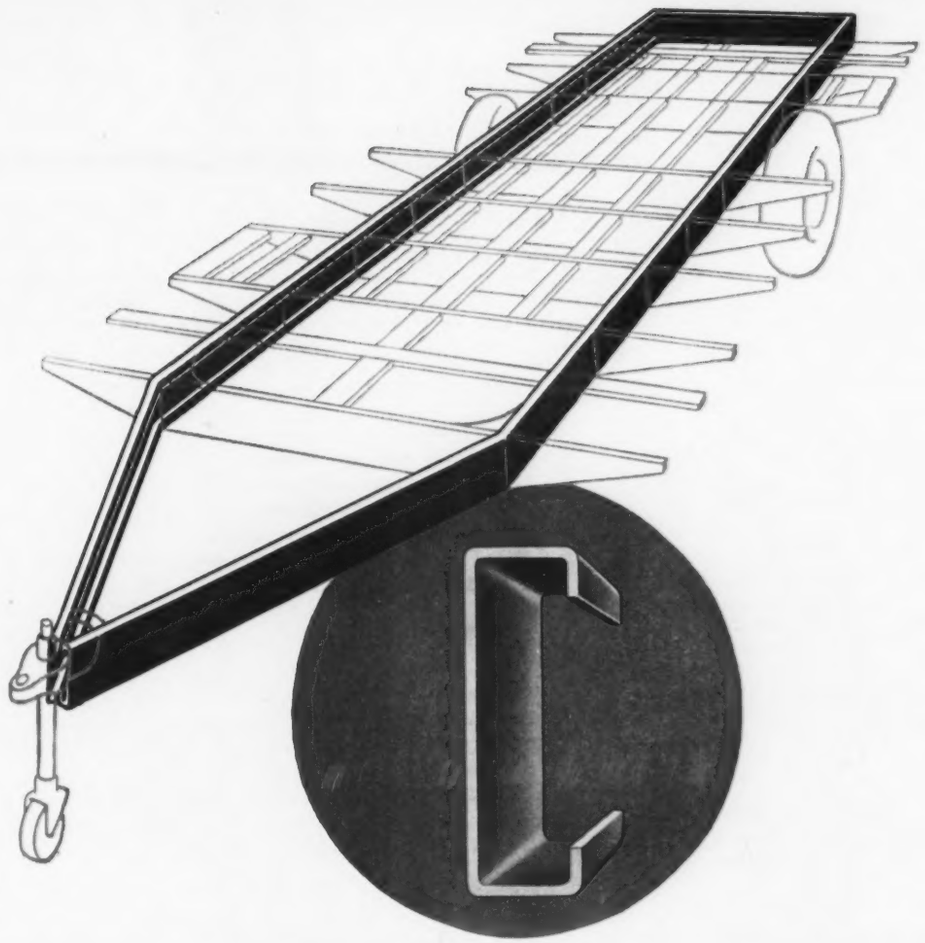

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